E15-21

Original Proposal

IBC: 1006.2.2.2, 1006.2.2.3 (IFC:[BE] 1006.2.2.2, 1006.2.2.3)

Proponents: Kevin Scott, KH Scott & Associates LLC, KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Building Code

Revise as follows:

1006.2.2.2 Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two *exits* or exit access doorways. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room.
All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. ~~An increase in *exit access* travel distance is permitted in accordance with Section 1017.1.~~

Exit and *exit access doorways* shall swing in the direction of egress travel and shall be equipped with *panic hardware*, regardless of the *occupant load* served. Exit and *exit access doorways* shall be tight fitting and *self-closing*.

1006.2.2.3 Refrigerated rooms or spaces.
Rooms or spaces having a floor area larger than 1,000 square feet (93 m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two *exits* or *exit access doorways*.
Exit access travel distance shall be determined as specified in Section <u>1017.1.</u> ~~1017.1 but all~~<u>All</u> portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway* <u>leading to a nonrefrigerated area</u> where such rooms are not protected by an *approved automatic sprinkler system*. ~~Egress is allowed through adjoining refrigerated rooms or spaces~~.

> **Exception:** Where using refrigerants in quantities limited to the amounts based on the volume set forth in the *International Mechanical Code*.

<u>Egress is allowed through adjoining refrigerated rooms or spaces.</u>

Reason: This proposal is designed to correlate and clarify the egress requirements for refrigerated rooms and associated machinery rooms.
In Section 1006.2.2.2, the second paragraph refers to a travel distance increase for refrigeration machinery rooms that is allowed in Section 1017.1. However, Section 1017.1 does not provide any increase in exit access travel distance for refrigeration machinery rooms; and in fact, Footnote a refers back to Section 1006.2.2.2 for distance limitations in refrigeration machinery rooms. This creates a circular reference and therefore this sentence is proposed to be deleted to eliminate the confusion.

In Section 1006.2.2.3, the second paragraph contains a requirement for nonsprinklered refrigerated rooms or spaces. This paragraph is revised to clarify that there are separate egress requirements.

- Exit access travel distance which is limited by Table 1017.1
- The travel distance within a nonsprinklered refrigerated room, which is limited to 150’

Additionally, language is added to clarify that the travel distance of 150’ is to reach an area outside of the refrigerated portion of the building.

The last sentence is moved to after the exception so it is a separate paragraph since it does not affect the exit access travel distance. This clarifies that the egress path can pass through intervening refrigerated rooms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This revision resolves correlation issues and clarifies the application of the requirements

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved based on proponent's request. There is a problem with the wording in Section 1006.2.2.3. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Jeffrey Shapiro, International Code Consultants, IIAR (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1006.2.2.2 Refrigeration machinery rooms . Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two *exits* or exit access doorways. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room.
<u>Exit access travel distance shall be determined as specified in Section 1017.1, but all portions of a refrigeration machinery room shall be within 150 feet (45 720 mm) of an exit or exit access doorway where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigeration machinery rooms or adjoining refrigerated rooms or spaces.</u>
~~All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. An increase in *exit access* travel distance is permitted in accordance with Section 1017.1.~~

Exit and *exit access doorways* shall swing in the direction of egress travel and shall be equipped with *panic hardware*, regardless of the *occupant load* served. Exit and *exit access doorways* shall be tight fitting and *self-closing*.

Commenter's Reason: The proponent of the original proposal correctly identified an issue with the circular reference in Section 1006.2.2.2, but a better fix is simply using identical text in Section 1006.2.2.2 and 1006.2.2.3, which does not have the same problem. The intent of both sections, which was clearly conveyed in the 2000 IBC and diminished in later editions as unrelated changes were made, is to restrict travel distance to 150 feet when sprinklers are not provided and to allow the occupancy classification associated travel distance when sprinklers are provided.
The unsprinklered condition is more restrictive than the general occupancy-related travel distance limit for unsprinklered occupancies in 1017.1. Hence the inclusion of special provisions in these sections, but only for unsprinklered conditions.

The suggested changes to 1006.2.2.3 were determined to be unnecessary. Any exit or exit access doorway will ultimately lead to a nonrefrigerated area, so adding that text accomplished nothing. And, moving the last sentence to after the exception wasn't necessary because egress is technically allowed through adjoining refrigerated rooms or spaces even if that text weren't present. There is nothing in the code that otherwise prohibits it.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Editorial clarification of existing requirements.

Final Hearing Results

E15-21	AMPC1

E17-21

Original Proposal

IBC: 1006.3 (IFC:[BE]1006.3)

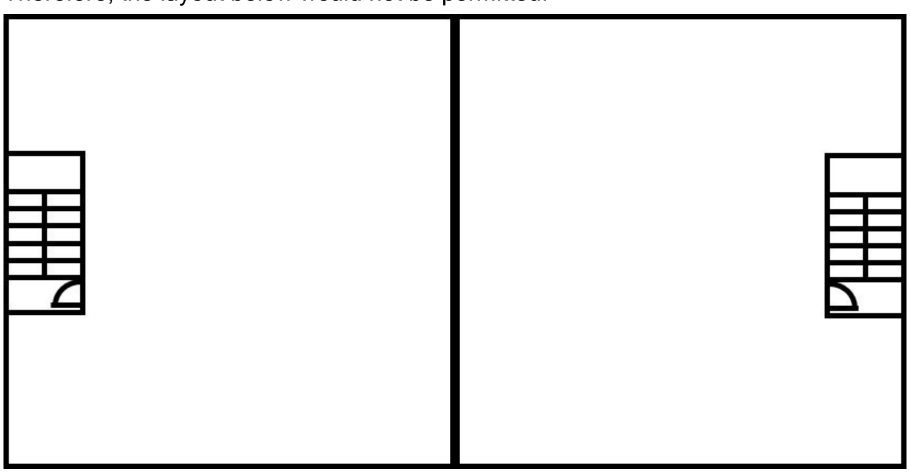
Proponents: Stephen Thomas, Colorado Code Consulting dba Shums Coda Associates, Inc., Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Building Code

Revise as follows:

1006.3 Egress from stories or occupied roofs.
~~The *means of egress* system serving any *story* or occupied roof shall be provided with the~~ All spaces located on a story or occupied roof shall have access to the required number of separate and distinct *exits* or access to *exits* based on the aggregate *occupant load* served in accordance with this section.

Reason: As this section was revised over the past couple of cycles, the intent was lost. It has always been intended that occupants on a story or occupied roof have access to the minimum number of required exits. The existing language does not say that. It just says that you have to have the minimum number of exits. Therefore, you could have a story that has two exits and if it is split into separate spaces, the occupants may not have access to the minimum number of exits. An interior exit stairway may only be accessed from a single tenant space and you are not permitted to exit through an adjacent tenant to get to an exit. The drawing below shows what the current language permits. The story has two exits on each end of the building. However, if the story is split in two, the occupants from either side do not access to the other interior exit stairway. This proposal clarifies the intent of the code and requires access to the minimum number of exits from a story. Therefore, the layout below would not be permitted.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to just clarify the intent of the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as this will clarify that all spaces on a story or an occupied roof have to have access to the required number of exits. (Vote: 12-1)

Final Hearing Results

E17-21 AS

E18-21

Original Proposal

IBC: 1006.3.2 (IFC:[BE]1006.3.2)

Proponents: Ed Roether, Ed Roether Consulting (ed@edroetherconsulting.com)

2021 International Building Code

Revise as follows:

1006.3.2 Path of egress travel. The path of egress travel to an *exit* shall not pass through more than one adjacent *story*.

Exception: The path of egress travel to an *exit* shall be permitted to pass through more than one adjacent *story* in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual dwelling unit, sleeping unit or live/work unit.
2. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility.
3. *Exit access stairways* and *ramps* within an *atrium* complying with Section 404.
4. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
5. *Exit access stairways* and *ramps* serving <u>smoke-protected assembly seating and</u> *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
6. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
7. Exterior *exit access stairways* and *ramps* between occupied roofs.

Reason: Smoke-protected assembly seating in many facilities span across multiple stories similar to many facilities with open air seating. This proposal clarifies that exit access travel distance requirements of Section 1030.7 apply to smoke-protected assembly seating and that path of egress travel can pass through more than one adjacent story similar to open air assembly seating. Allowing exit access through more than one story from smoke-protected assembly seating is crucial for these large facilities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposed change essentially coordinates the building code with how these large facilities have been designed and built for many years.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as a clarification. Smoke-protected assembly seating and open-air assembly seating have the same requirements for means of egress. (Voter: 12-1)

Final Hearing Results

E18-21 AS

E21-21

Original Proposal

IBC: TABLE 1006.3.3, TABLE 1006.3.4(1), TABLE 1006.3.4(2) [IFC:[BE] TABLE 1006.3.3, TABLE 1006.3.4(1), TABLE 1006.3.4(2)]

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

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1006.3.3 Egress based on occupant load. Each *story* and occupied roof shall have the minimum number of separate and distinct *exits*, or access to *exits*, as specified in Table 1006.3.3. A single *exit* or access to a single *exit* shall be permitted in accordance with Section 1006.3.4. The required number of *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any *story* or occupied roof shall be maintained until arrival at the *exit discharge* or a *public way*.

Revise as follows:

TABLE 1006.3.3 MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY OR OCCUPIED ROOF

OCCUPANT LOAD PER STORY OR OCCUPIED ROOF	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM PER STORY OR OCCUPIED ROOF
1-500	2
501-1,000	3
More than 1,000	4

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or occupied roof where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

TABLE 1006.3.4(1) STORIES AND OCCUPIED ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY OR OCCUPIED ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupied roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with anautomatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupied roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupied roofs that are not access through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIED ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIED ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIED ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupied roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an*automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with *emergency escape and rescue openings* in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an*automatic sprinkler system* in accordance with Section 903.3.1.1 or on the roof of such buildings shall have a maximum *exit access* travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of *sleeping units.* For Group R-2 occupancies consisting of *dwelling units*, use Table 1006.3.4(1).

d. The length of *exit access* travel distance in a Group S-2 *open parking garage* shall be not more than 100 feet.

Reason: The change to the title and heading in Table 1006.3.3 is for consistency with the text.
The proposed modifications to Section 1006 includes adding 'occupied roofs' to Table 1006.3.4(1) to clarify the conditions in which one exit or access to one exit is allowed for rooftop decks or balconies for individual units in Group R-2 occupancies. Footnote c sends you to other occupancies for shared roof decks because you are now a mixed use occupancy. While the occupied roof is not a story for height and area, the allowance for a single exit is set at the 3rd story.Similarly this proposal adds 'occupied roofs' to Table 1006.3.4(2) to clarify the conditions in which one exit or access to one exit is allowed for the other occupancies, including a shared occupied roof on an apartment building. While Group A, E, H, I, R-1, R-2 and S are limited to a first story with a single exit, allowing for one exit from the roof of these buildings is comparable, and probably safer, to being able to travel up from the basements (which is currently permitted). A proposed modification to footnote b or the table clarifies that the allowable increase in exit access travel distance from 75 feet to 100 feet for properly sprinklered Group B, F and S occupancies also includes the roof area for these uses.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarification to a subject that was not previously addressed. The changes to the single occupant tables could allow

for one exit stairway from an occupied roof instead of two.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved as an occupied roof is not a story, so the number of exits from the occupied roof needs to be clarified. The location of the occupied roof allowance in Table 1006.3.4(2) is appropriate as the occupied roof over the 1st floor is the same vertical travel as from the basement level. This is a good correlation with the occupied roof requirements in the code. (Vote: 10-4)

Final Hearing Results

E21-21	AS

E24-21

Original Proposal

IBC: 1008.1, 1008.3, 1008.3.1 (IFC:[BE] 1008.1, 1008.3, 1008.3.1)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 1008
MEANS OF EGRESS ILLUMINATION

Revise as follows:

1008.1 Means of egress illumination. Illumination shall be provided in the *means of egress* in accordance with Section 1008.2. ~~Under emergency power~~ In the event of power supply failure, *means of egress* illumination shall comply with Section 1008.3.

1008.2 Illumination required. The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
4. *Sleeping units* of Group I occupancies.

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1008.2.2 Group I-2. In Group I-2 occupancies where two or more *exits* are required, on the exterior landings required by Section 1010.1.5, means of egress illumination levels for the exit discharge shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the exit discharge from each exit to the *public way*.

Exception: Illumination shall not be required where the path of the exit discharge meets both of the following requirements:

1. The path of exit discharge is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Revise as follows:

~~1008.3~~ 1008.2.4 ~~Emergency power~~ Power for illumination. The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply.

~~1008.3.1~~ 1008.3 ~~General~~ Illumination required with the emergency electrical system. In the event of power supply failure in rooms and spaces that require two or more *exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas:

1. *Aisles*.
2. *Corridors*.
3. *Exit access stairways* and *ramps*.

~~1008.3.2~~ 1008.3.1 Buildings. In the event of power supply failure in buildings that require two or more*exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas:

1. *Interior exit access stairways* and *ramps*.
2. *Interior* and *exterior exit stairways* and *ramps*.
3. *Exit passageways*.
4. Vestibules and areas on the level of discharge used for*exit discharge* in accordance with Section 1028.2.
5. Exterior landings as required by Section 1010.1.5 for *exit doorways* that lead directly to the *exit discharge*.

~~1008.3.3~~ 1008.3.2 Rooms and spaces. In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Electrical equipment rooms.
2. Fire command centers.
3. Fire pump rooms.
4. Generator rooms.
5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

~~1008.3.4~~ 1008.3.3 Duration. The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702.

~~1008.3.5~~ 1008.3.4 Illumination level under emergency power. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 footcandle (2.2 lux).

Reason: The intent of this proposal is to split this section into requirements for general means of egress illumination (1008.2) and emergency lighting (1008.3). To truly accomplish this, the sections should be re-arranged as indicated.
Section 1008.3 is currently titled '*Emergency power for illumination*.' However, that section really deals with general MOE lighting requirements, not emergency lighting requirements. Emergency lighting power requirements are addressed Sections 1008.3.3 and 1008.3.4. So we relocated it from 1008.3 to 1008.2.3 to group the lighting requirements appropriately.

The text change in Section 1008.1 will match the scoping phrase used in 1008.3, 1008.3.1 and 1008.3.2.Title changes in Section 1008.2.3 and 1008.3 will reinforce the idea of two different requirements – one for regular lighting and one for emergency lighting.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in

July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a reorganization of existing text.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as an editorial grouping of means of egress and emergency lighting equipment. (Vote: 9-4)

Public Comments

Public Comment 1

Proponents: Jonathan Siu, Self requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 1008 MEANS OF EGRESS ILLUMINATION .

1008.1 Means of egress illumination . Illumination shall be provided in the *means of egress* in accordance with Section 1008.2. In the event of power supply failure, *means of egress* illumination shall comply with Section 1008.3.

1008.2 Illumination required . The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
4. *Sleeping units* of Group I occupancies.

1008.2.1 Illumination level under normal power . The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).

2. Steps, landings and the sides of *ramps* shall be permitted to be marked with*self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1008.2.2 Group I-2 . In Group I-2 occupancies where two or more *exits* are required, on the exterior landings required by Section 1010.1.5, means of egress illumination levels for the exit discharge shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

1008.2.3 Exit discharge . Illumination shall be provided along the path of travel for the exit discharge from each exit to the*public way*.

Exception: Illumination shall not be required where the path of the exit discharge meets both of the following requirements:

1. The path of exit discharge is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

1008.2.4 Power for illumination . The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply.

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. Aisles.
   1.2. Corridors.
   1.3. Exit access stairways and ramps.
2. In buildings that require two or more exits or access to exits:
   2.1. Interior exit access stairways and ramps.
   2.2. Interior and exterior exit stairways and ramps.
   2.3. Exit passageways
   2.4. Vestibules and areas on the level of discharge used for exit discharge in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the exit discharge.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. Fire command centers.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

~~**1008.3 Illumination required with the emergency electricalsystem system .**~~ ~~In the event of power supply failure in rooms and spaces that require two or more *exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas: an emergency an emergency~~

~~1. *Aisles*.~~
~~2. *Corridors*.~~
~~3. *Exit access stairways* and *ramps*.~~

~~**1008.3.1 Buildings .**~~ ~~In the event of power supply failure in buildings that require two or more*exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas:~~

1. ~~*Interior exit access stairways* and *ramps*.~~

2. ~~*Interior* and *exterior exit stairways* and *ramps*.~~

3. ~~*Exit passageways*.~~

4. ~~Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.~~

5. ~~Exterior landings as required by Section 1010.1.5 for *exit doorways* that lead directly to the *exit discharge*.~~

~~**1008.3.2 Rooms and spaces .** In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:~~

1. ~~Electrical equipment rooms.~~

2. ~~Fire command centers.~~

3. ~~Fire pump rooms.~~

4. ~~Generator rooms.~~

5. ~~Public restrooms with an area greater than 300 square feet (27.87 m²).~~

~~**1008.3.3**~~ <u>**1008.3.1**</u> **Duration .** The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702.

~~**1008.3.4**~~ <u>**1008.3.2**</u> **Illumination level under emergency power .** Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 footcandle (2.2 lux).

Commenter's Reason: This proposed reorganization of Section 1008.3 does not improve the code, and in fact, makes it more difficult to enforce. This public comment is intended to clarify the application of the code provisions, while preserving the intent of the original code change proposal.
Under the current organization, each subsection in Section 1008.3 stands by itself--the requirements in the subsection are charged within that subsection. However, with the proposed code change, the old subsections 1008.3.2 and 1008.3.3 are now subsections to 1008.3. The problem is that the language in 1008.3 is not being changed to provide charging language for the new 1008.3.1 or 1008.3.2.

Referring to the section numbering in the proposal, 1008.3 says aisles, corridors, and exit access stairways and ramps need to have emergency illumination. However, 1008.3.1 and 1008.3.2 require illumination for buildings, rooms, and spaces that are not aisles, corridors, or exit access stairways/ramps. If they are subsections to 1008.3, how do you get to them? 1008.3 isn't providing any sort of charging language for 1008.3.1 or 1008.3.2, and subsection numbering is not a substitute for charging language.

This public comment charges all the provisions for where an emergency electrical system for means of egress illumination is required in the text of Section 1008.3 ("...shall be provided...in all of the following areas....") It also simplifies the code by removing repetitive code text and replacing the subsections with a single list.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The cost impact statement for original proposal said it is a reorganization of the existing text. This public comment is merely a further reorganization of the proposed text.

Final Hearing Results

E24-21	AMPC1

E25-21

Original Proposal

IBC: 1008.2 (IFC:[BE]1008.2)

Proponents: Andrew Klein, Self Storage Association (andrew@asklein.com)

2021 International Building Code

Revise as follows:

1008.2 Illumination required. The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. Self-service storage units accessed directly from the exterior.
3. ~~2.~~ *Aisle accessways* in Group A.
4. ~~3.~~ *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
5. ~~4.~~ *Sleeping units* of Group I occupancies.

Reason: Although classified as Group S, exterior-access self storage facilities (those with rolling doors that open up for each unit) are similar in nature to Group U occupancies in the fact they are small, easily navigable, and have short dwell times. Many jurisdictions already do not require lighting inside of such units because they are not considered occupiable, and the safety concern of tenants unsing electricity for personal use and unregulated activities. This code change codifies for all jurisdictons that providing light inside of such units is unnecessary from a safety perspective and therefore not required.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Most jurisdictions already interpret the code to not require illumination in self-service storage units that are accessible from the exterior. For jurisdictions that do require illumination, this code change will decrease the cost of construction.

Public Hearing Results

Committee Action	**Disapproved**

Committee Reason: The proposal was disapproved because the proposal did not limit the size of the self-storage facility that could use this exception. The proposal would be better if it also added "of the building" after "exterior." (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Andrew Klein, Self Storage Association (andrew@asklein.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1008.2 Illumination required. The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. Self-service storage units 400 ft^2 (37.16 m^2) or less in area andaccessed directly from the exterior of the building.
3. *Aisle accessways* in Group A.
4. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
5. *Sleeping units* of Group I occupancies.

Commenter's Reason: This PC address the concerns of the committee. A maximum area of 400 SF was determined by the industry to be the maximum unit size to allow sufficient day light or exterior site lighting into all areas of the unit when the door is open.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This PC will decrease the cost of construction where interior lighting would otherwise be required within self-storage units.

Final Hearing Results

E25-21	AMPC1

E28-21

Original Proposal

IBC: 1009.2.1 (IFC: [BE]1009.2.1)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

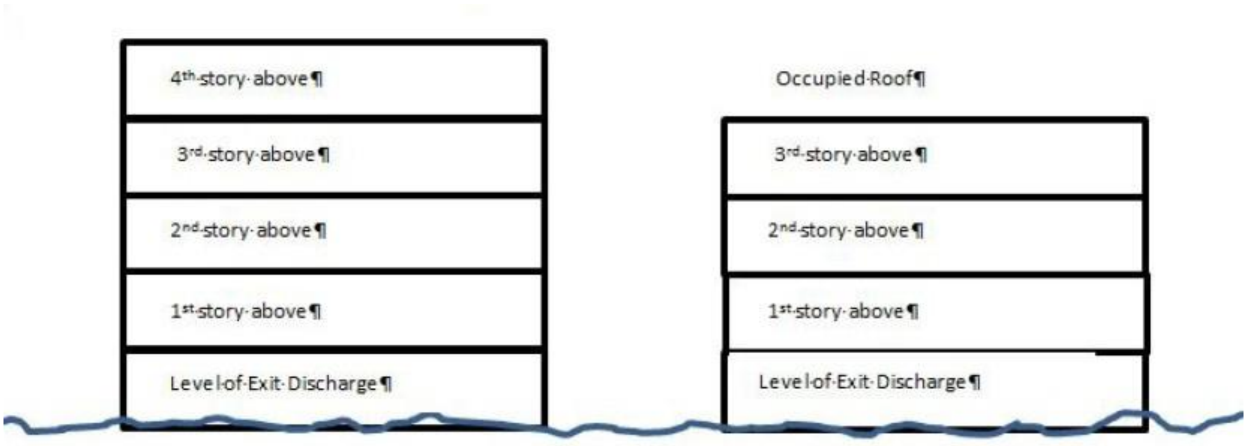
1009.2.1 Elevators required. In buildings where a required accessible floor~~or occupied roof~~ is four or more stories above or below a *level of exit discharge* or where an accessible occupied roof is above a story that is three or more stories above the level of exit discharge, not less than one required *accessible means of egress* shall ~~be~~ include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the accessible means of egress on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.

Reason: The intent of this proposal is a clarification in terminology.
The new language added by E30-18 is confusing. An occupied roof is not a story. Therefore, to be clear, the requirement for an occupied roof should be dealt with separately from the number of stories in a building. It is not the intent of this proposal to change to result of what was voted approved by the MOE Code Development Committee.

It is important to point out that the original change said that there was no fiscal impact. Since the occupied roof is not considered a story for height and area limitations, with the 2018 text, it could have been interpreted that standby power was not required to an occupied roof on a 4 story building. Therefore, this does have a significant cost for a 4 story building that decides to have an occupied roof.



The addition of "as

Height at which standby power would be required on the elevator for accessible MOE

part of the means of egress" added into the exceptions will clarify this limitation all the exception. The elevator is part of the accessible means of egress, not the only piece. When an elevator is required as part of an accessible means of egress, Section 1009.4 would require standby power.

This is one of a series of three independent proposals for this section. If all three are passed, the result will be this. The proposals each stand on their own.

1009.2.1 Elevators required.

In buildings where a required *accessible* floor ~~or occupied roof~~ is four or more *stories* above or below a *level of exit discharge* <u>or where an accessible occupied roof is above a story that is three or more stories above the level of exit discharge,</u> not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required <u>as part of an accessible means of egress</u> on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.

2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required <u>as part of an accessible means of egress</u> on floors <u>or occupied roofs</u> provided with a *ramp* conforming to the provisions of Section 1012.

3. <u>In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of an accessible means of egress for an occupied roof where the floors located at or above the level of exit discharge are provided with a horizontal exit.</u>

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of the text and has no technical changes to construction requirements.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because an occupied roof is not a story so this revision does not clarify the requirements. (Vote: 8-6)

Public Comments

Public Comment 1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org) requests As Submitted

Commenter's Reason: The committee statement for disapproval is the very reason that this proposal is needed. There was a tendency to overthink the issue here. But, clearly an occupied roof is not a story – therefore it needs to be clarified on what height of building (in stories) with an occupied roof needs to provide an elevator with standby power. Standby power is an expensive item, so it is important to be technically correct.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is a clarification of the text and has no technical changes to construction requirements.

Final Hearing Results

E28-21	AS

E30-21

Original Proposal

IBC: 1009.2.1 (IFC:[BE] 1009.2.1)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1009.2.1 Elevators required. In buildings where a required accessible floor or occupied roof is four or more stories above or below a*level of exit discharge*, not less than one required*accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an*automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an*automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required <u>as part of an accessible means of egress</u> on floors <u>or occupied roofs</u> provided with a *ramp* conforming to the provisions of Section 1012.

Reason: The intent of this proposal is to allow for ramps to serve as an accessible route off an occupied roof instead of requiring standby power on the elevator for that occupied roof. (This is **<u>not</u>** an exception for the accessible route requirements to these spaces in Chapter 11.) Ramps are is already permitted to serve as the accessible means of egress for all floors below the roof. E30-18 added that occupied roofs to the main text, but did not add it to the exception. Ramps to all levels is commonly used in parking garages and large stadiums.
The addition of “as part of the means of egress” added into the exceptions will clarify this limitation all the exception. The elevator is part of the accessible means of egress, not the only piece. When an elevator is required as part of an accessible means of egress, Section 1009.4 would require standby power.

This is one of a series of three independent proposals for this section. They work together, but could be approved separately.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will decrease the cost of construction
If on occupied roof is provided on a building with ramp access to the levels, such as a parking garage are large sports arena, this revision will clarify that standby power is not required to the elevator.

Staff Note: Proposals E30-21 and E31-21 combined and Proposal E32-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved since this adds ramps as way off the roof the same as the floors below. (Vote: 14-0)

Final Hearing Results

E30-21	AS

E34-21

Original Proposal

IBC: 1009.2.2 (New) [IFC:[BE]1009.2.2 (New)]

Proponents: Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Add new text as follows:

1009.2.2 Doors. Where doors are part of an accessible route to provide access to an exit, area of refuge or exterior area of assisted rescue the doors shall provide maneuvering clearances required by ICC A117.1 in the direction of egress.

> **Exception:** Maneuvering clearances are not required at the exit stairways for levels above and below the level of exit discharge where the exit enclosure does not include an area of refuge.

Reason: The purpose of this proposal is to clarify where maneuvering clearances at doorways along the route for accessible means of egress are required. This proposal is consistent with interpretations from ICC staff and the commentary. It has been unclear from the code language whether the doors into stairways that are a part of the accessible means of egress are required to comply with the door maneuvering clearance of the ICC A117.1 standard or not. Various jurisdictions interpret the requirement differently, leaving it applied inconsistently across the country.
This is not just a question at exit stairways, but rather a general concern for the accessible routes out of a building during an emergency evacuation. An exterior areas of rescue assistance or an areas of refuge is a location that a person with mobility impairments can access independently. It is at this location where the emergency responders can find them to offer assistance away from the building or down the stairway. A common question is if the doors leading to these areas are required to have maneuvering clearances on both sides of the doors. It is important that those doors be located so that they swing in the direction of travel (1010.1.2.1) and do not block other occupants leaving the building. Best practice would also have the door positioned to allow for a quick and direct entry into the wheelchair spaces required in Section 1009.6.3. A balance for general safety and accessibility must be considered, therefore, an accessible route back into the building for an egress only route should not be a minimum requirement.

If the accessible route at the level of exit discharge is through the stairway, maneuvering clearances need to be provided in the direction of egress travel so a person can self-evacuate.

The purpose of the exception is for situations where the person is waiting outside of the stairway for emergency assistance since there is not a required area of refuge in the stairway of sprinklered buildings (1009.3.3). There may be situations where it is desirable to ask people to move to the stairways for assistance in some situations. The activation of the sprinklers, automatic notification of the fire department, and the information from the fire alarm panel when the fire department arrives should make it so that someone would not have to move into the stairway enclosure. The fire department also has the option for using the elevator for assisted evacuation in any elevator building using fire department recall; with the additional improvements of standby power (1009.4.1) at five stories and the fire service access elevator protections (3006) at 120 feet.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is to insert language into the code to address the manner in which it is currently being interpreted. It will neither increase not decrease costs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1009.2.2 Doors. Where doors are part of an accessible route to provide access to an exit, area of refuge or exterior area of assisted rescue~~, the doors shall provide~~ maneuvering clearances shall be provided at such doors asrequired by ICC A117.1 in the direction of egress.
Where doors lead to an area of refuge or exterior area for assisted rescue and re-entry to the floor is possible, maneuvering shall be provided on both sides of the door.

Exception:
Maneuvering clearances are not required at~~the~~ doors to exit stairways for levels above and below the level of exit discharge where the exit enclosure does not include an area of refuge.

Committee Reason: The modifications to the first sentence and the exception provide better grammar specific to the elements and is technically more accurate. The modification that added the 2nd sentence provides best practice for areas of refuge or exterior areas for assisted rescue, however, there was concern that "where possible" was vague and would lead to wide interpretations. The proposal adds needed clarification for exit stairway doors and indicates where independent access is required. (Vote: 14-0)

Final Hearing Results

E34-21	AM

E37-21 Part I

Original Proposal

PART I - IBC: 1009.11, 3002.3; IFC:([BE] 1009.11), 604.4
PART II - IFC: 1103.3.2

Proponents: Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1009.11 Instructions. In *areas of refuge*, ~~and~~ exterior areas for assisted rescue, and locations required to provide two-way communications systems complying with Section 1009.8 instructions on the use of the area under emergency conditions shall be posted. Signage shall comply with the ICC A117.1 requirements for visual characters. The instructions shall include all of the following:

1. Persons able to use the *exit stairway* do so as soon as possible, unless they are assisting others.
2. Information on planned availability of assistance in the use of *stairs* or supervised operation of elevators and how to summon such assistance.
3. Directions for use of the two-way communication system where provided.

3002.3 Emergency signs. A ~~An approved~~ pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. Where elevators are not a component of the accessible means of egress the ~~The~~ sign shall read: IN CASE OF FIRE, ELEVATORS ARE OUT OF SERVICE. USE EXIT~~STAIRS~~. Where the elevator is a component of the accessible means of egress a sign complying with Section 1009.11 shall be provided.

Exception ~~**Exceptions**~~**:**

~~1. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with Section 1009.4.~~

~~2.~~ The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section 3008.

Reason: The proposal seeks to fill a hole in the current code provision. It includes a requirement for instructions for use of the two-way communications system but does not require the sign to be provided at locations where there is a two-way communications system.
This proposal is directed at making this provision clearer and better directed at people with mobility disabilities. The exception was added for that purpose, but it does not go far enough.

The word “approved” means nothing. All plans must be approved by the AHJ.

The stricken text at the end of the first sentence is because it is not necessary. The verbiage states the specific requirement. Also, where the sign from Section 1009.11 is provided, it could be considered a contradiction.

The word “STAIR” is stricken because that is not a part of the provisions of Section 2.27.9 in the ASME/A17.1 Elevator Code. This puts the text in accordance with the Elevator Code (see below).

The added text in both the second sentence and new third sentence is to differentiate when it is appropriate to use one sign or the other.

Exception number 1 is deleted, and the provision is added to the main body of the requirement. This is to avoid confusion and provide additional information for the person at the elevator call station. Where the elevator is a part of the accessible means of egress, the current text allows but does not require the omission of the sign stating “… ELEVATORS ARE OUT OF SERVICE. USE EXIT.” This can lead to confusion where the sign is present, and the elevator is part of the accessible means of egress. This does not provide a person with a mobility device the necessary information they need. By requiring one sign for an elevator that is a part of the accessible means of egress and a different sign for an elevator which is not, the person using the elevator will better understand the capability of the elevator to provide their evacuation.

2.27.9 Elevator Corridor Call Station Pictograph

When the building code requires a sign be posted adjacent to hall call fixtures instructing occupants not to use the elevator in case of fire, the sign shown in Exhibit S2.5 shall be provided. The sign shall include only the wording and graphics shown in Exhibit S2.5. When the building code specifies a different design, 2.27.9 shall not apply.

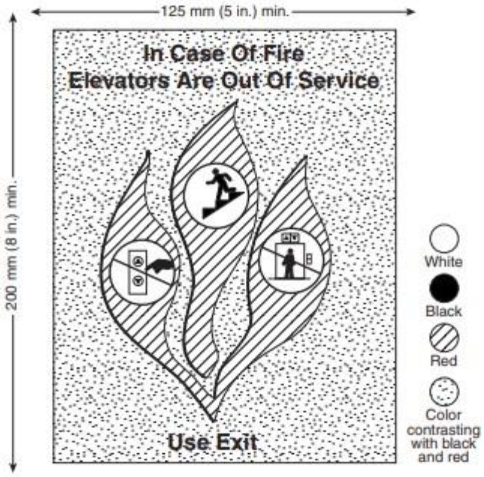


Exhibit S2.5 Elevator Corridor Call Station Pictograph. (From ASME A17.1 Section 2.27, Fig. 2.27.9)

EXTRACTS FROM *ASME A17.1 HANDBOOK*, SECTION 2.27 EMERGENCY OPERATION AND SIGNALING DEVICES"

Bibliography: ASME A17.1 - Elevator Code

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification. Currently there is a sign required at the elevator. A sign will still be required at the elevator. The difference is that the signage will be clearer in it's application.

Staff note: IFC Section 604.4 has an errata for the elevator signage so that is matches current IBC Section 3002.3.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal as approved because it provides for instructions at all two-way communication system. This also provides appropriate information at elevators as needed and is coordinated with ASME A17.1. (Vote: 12-2)

Final Hearing Results

E37-21 Part II

Original Proposal

PART II - IFC: 1103.3.2

Proponents: Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Fire Code

Revise as follows:

1103.3.2 Elevator emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3.

Exceptions:

1. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where protected at the elevator shaft openings with additional fire doors in accordance with Section 716 of the International Building Code and where all of the following conditions are met:
   1.1. The doors shall be provided with vision panels of*approved* fire-protection-rated glazing so located as to furnish clear vision of the approach to the elevator. Such glazing shall not exceed 100 square inches (0.065 m^2) in area.

   1.2. The doors shall be held open but be automatic-closing by activation of a fire alarm initiating device installed in accordance with the requirements of NFPA 72 as for Phase I Emergency Recall Operation, and shall be located at each floor served by the elevator; in the associated elevator machine room, control space, or control room; and in the elevator hoistway, where sprinklers are located in those hoistways.

   1.3. The doors, when closed, shall have signs visible from the approach area stating: "WHEN THESE DOORS ARE CLOSED OR IN CASE OF FIRE ~~EMERGENCY~~, ~~DO NOT USE ELEVATOR~~ ELEVATORS ARE OUT OF SERVICE. USE EXIT ~~STAIRWAYS~~."

2. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where provided with *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3. Freight elevators in buildings provided with both*automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and not less than one ASME 17.3-compliant elevator serving the same floors.

Elimination of previously installed Phase I emergency recall or Phase II emergency in-car systems shall not be permitted.

Reason: The proposal seeks to fill a hole in the current code provision. It includes a requirement for instructions for use of the two-way communications system but does not require the sign to be provided at locations where there is a two-way communications system. This proposal is directed at making this provision clearer and better directed at people with mobility disabilities. The exception was added for that purpose, but it does not go far enough.

The word "approved" means nothing. All plans must be approved by the AHJ.

The stricken text at the end of the first sentence is because it is not necessary. The verbiage states the specific requirement. Also, where the sign from Section 1009.11 is provided, it could be considered a contradiction.

The word "STAIR" is stricken because that is not a part of the provisions of Section 2.27.9 in the ASME/A17.1 Elevator Code. This puts the text in accordance with the Elevator Code (see below).

The added text in both the second sentence and new third sentence is to differentiate when it is appropriate to use one sign or the other.Exception number 1 is deleted, and the provision is added to the main body of the requirement. This is to avoid confusion and provide additional information for the person at the elevator call station. Where the elevator is a part of the accessible means of egress, the current text allows but does not require the omission of the sign stating "… ELEVATORS ARE OUT OF SERVICE. USE EXIT." This can lead to confusion where the sign is present, and the elevator is part of the accessible means of egress. This does not provide a person with a mobility device the necessary information they need. By requiring one sign for an elevator that is a part of the accessible means of egress and a different sign for an elevator which is not, the person using the elevator will better understand the capability of the elevator to provide their evacuation.

2.27.9 Elevator Corridor Call Station Pictograph

When the building code requires a sign be posted adjacent to hall call fixtures instructing occupants not to use the elevator in case of fire, the sign shown in Exhibit S2.5 shall be provided. The sign shall include only the wording and graphics shown in Exhibit S2.5. When the building code specifies a different design, 2.27.9 shall not apply.

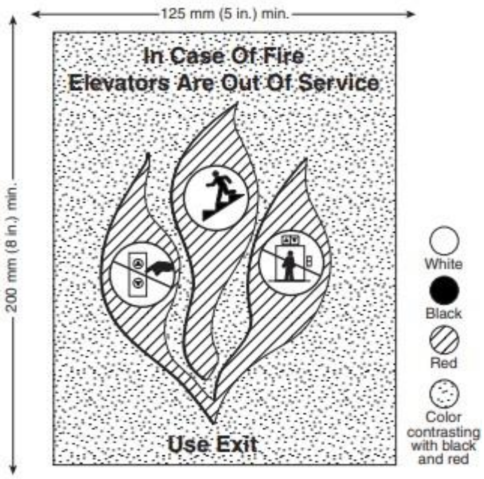


Exhibit S2.5 *Elevator Corridor Call Station Pictograph. (From ASME A17.1 Section 2.27, Fig. 2.27.9)*

EXTRACTS FROM *ASME A17.1 HANDBOOK*, SECTION 2.27 EMERGENCY OPERATION AND SIGNALING DEVICES"

Bibliography: ASME A17.1 - Elevator Code

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification. Currently there is a sign required at the elevator. A sign will still be required at the elevator. The difference is that the signage will be clearer in it's application.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was a the preferred method of verbiage for elevator signage as compared with proposal F113-21. (Vote: 12-1)

Final Hearing Results

E37-21 Part II AS

E38-21

Original Proposal

IBC: 1003.3.1, 1010.1.1, 1010.1.1.1 (IFC:[BE]1003.3.1, 1010.1.1, 1010.1.1.1)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1010.1.1 Size of doors. The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the <u>frame</u> stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm). In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a minimum clear opening width of $41^1/_2$ inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an *Accessible unit*, *Type A unit* or *Type B unit*, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident *sleeping units* that are not required to be an *Accessible unit* shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
5. The maximum width of door leaves in *power-operated doors* that comply with Section 1010.3.2 shall not be limited.
6. Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).
7. In *dwelling and sleeping units* that are not required to be *Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).
8. In Groups I-1, R-2, R-3 and R-4, in *dwelling and sleeping units* that are not required to be Accessible, Type A or *Type B units*, the minimum clear opening widths shall not apply to interior egress doors.
9. Door openings required to be *accessible* within *Type B units* intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m^2) in area shall have a maximum width of 60 inches (1524 mm) nominal.
11. Doors serving nonaccessible single-user shower or sauna compartments, toilet stalls or dressing, fitting or changing rooms shall have a minimum clear opening width of 20 inches (508 mm).

1010.1.1.1 Projections into clear opening. There shall not be projections into the required clear opening width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

Exception: Door closers, overhead door stops, <u>frame stops,</u> power door operators, and electromagnetic door locks shall be permitted to <u>project into the door opening height not lower than</u> ~~be~~ 78 inches (1980 mm) minimum above the floor.

1003.3.1 Headroom. Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any circulation paths, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a *means of egress* shall be reduced in height by protruding objects.

> **Exception:** ~~Door closers and stops shall not reduce headroom to less than 78 inches (1981 mm).~~Door closers, overhead door stops, frame stops, power door operators, and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) minimum above the floor.

A barrier shall be provided where the vertical clearance above a *circulation path* is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

Reason: The intent of this proposal is to remove some confusing text. The last sentence of main paragraph, was changed (E47-15 by BCAC) for consistent terminology. However, by changing the door height to "clear opening" instead of "opening", now has code officials asking if the threshold and overhead stop need to be considered in the 80" height or not? (Door stops are excluded for the width of door openings in the 2nd sentence of Section 1010.1.1.) With the clarification in Section 1010.1.1.1 as part of E41-18, door stops at the top are permitted into the opening height.
The proposed revision in Section 1003.3.1 correlation with Section 1010.1.1.1.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of requirement, not a change in door size or door opening size.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because this clarifies the intent of the height of the door opening and what can project into that opening. (Vote: 14-0)

Final Hearing Results

E38-21	AS

E39-21

Original Proposal

IBC: 1010.1.1, 1010.4 (IFC:[BE]1010.1.1, 1010.4)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1010.1.1 Size of doors. The required capacity of each door opening shall be sufficient for the*occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width o 32 inches (813 mm). In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a minimum clear opening width of 41$^{1}/_{2}$ inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an*Accessible unit*, *Type A unit* or *Type B unit*, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident*sleeping units* that are not required to be an*Accessible unit* shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. ~~The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited~~.
5. ~~The maximum width of door leaves in*power-operated doors* that comply with Section 1010.3.2 shall not be limited~~.

4.~~6.~~ Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).

5.~~7.~~ In *dwelling and sleeping units* that are not required to be*Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).

6.~~8.~~ In Groups I-1, R-2, R-3 and R-4, in*dwelling and sleeping units* that are not required to be Accessible, Type A or*Type B units*, the minimum clear opening widths shall not apply to interior egress doors.

7.~~9.~~ Door openings required to be *accessible* within *Type B units* intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).

~~10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m²) in area shall have a maximum width of 60 inches (1524 mm) nominal.~~

8.~~11.~~ Doors serving nonaccessible single-user shower or sauna compartments, toilet stalls or dressing, fitting or changing rooms shall have a minimum clear opening width of 20 inches (508 mm).

1010.4 Gates. Gates serving the *means of egress* system shall comply with the requirements of this section. Gates used as a component in a *means of egress* shall conform to the applicable requirements for doors.

~~**Exception:** Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.~~

Reason: E39-18 deleted the maximum width requirements from the base provisions, therefore Exceptions 4 and 5 are no longer needed. There’s no need to limit the size of doors for power-operated doors or power-operated revolving doors. The standards referenced for power-operated doors and and power-operated revolving doors require safety features for all these doors.

The only exception remaining that deals with the maximum door size is Exception 10. With the maximum size deleted from the base paragraph, this exception is technically no longer an exception to the main text, so it should be deleted for both technical reasons and consistency. If the doors do not have a maximum width, the size limit for gates is not needed in the exception.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no technical changes to requirements for power operated or revolving doors because this is regulated by the standard. This may allow additional design options for walk-in coolers and freezers.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it coordinates the exceptions with the removal of the requirements for maximum door width in E39-18. (Vote: 14-0)

Final Hearing Results

E39-21	AS

E40-21

Original Proposal

IBC: 1010.1.1 (IFC:[BE] 1010.1.1)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1010.1.1 Size of doors. The required capacity of each door opening shall be sufficient for the*occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width o 32 inches (813 mm). In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a minimum clear opening width of $41^1/_2$ inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an*Accessible unit*, *Type A unit* or *Type B unit*, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident*sleeping units* that are not required to be an*Accessible unit* shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
5. The maximum width of door leaves in*power-operated doors* that comply with Section 1010.3.2 shall not be limited.
6. Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).
7. In *dwelling and sleeping units* that are not required to be*Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).
8. In Groups I-1, R-2, R-3 and R-4, in*dwelling and sleeping units* that are not required to be Accessible, Type A or*Type B units*, the minimum clear opening widths shall not apply to interior egress doors.
9. Door openings required to be *accessible* within *Type B units* intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m^2) in area shall have a maximum width of 60 inches (1524 mm) nominal.
11. Doors serving ~~nonaccessible single-user shower or~~ sauna compartments, toilet ~~stalls~~ compartments or dressing, fitting or changing ~~rooms~~ compartments that are not required to be accessibleshall have a minimum clear opening width of 20 inches (508 mm).
12. Door serving shower compartments in other than Accessible units or Type A units are not required to provide a minimum clear opening width.

Reason: The intent of this proposal clarify which spaces the exception applies to, and remove a conflict for shower compartments with sliding shower compartment doors.

E40-18 was a proposal that added an exception for non-accessible dressing rooms or fitting rooms. This was Disapproved during the Committee Action Hearings because it could be applied to a large changing room that accommodates several individuals, such as a bridal fitting room where the 32” clear width door opening is necessary. The revision to Exception #11 would clarify that this applies to compartments, not rooms.The Proponent submitted a Public Comment revising and combining some of the exceptions into one exception for doors serving non-accessible single-user showers, toilet stalls, and dressing rooms, and allowed for a minimum clear opening width of 20”. The Reason Statement stated that the 20” width came from research to address doors serving these types of individual uses, and that it would address the needs of non-accessible dressing rooms, single-use toilet rooms, and shower compartments — all for single-person use rooms.
Exception #11 currently requires a 20” minimum clear opening for doors serving non-accessible single shower compartments. But that minimum clear opening width would conflict with the width of a sliding door on a standard 36”x36” shower compartments.

Revising exception #11 would remove shower compartments from the list of spaces where a 20” clear width opening requirement would apply to the door opening and move that to exception #12. Shower compartments in Accessible and Type A units would comply with 2017 ICC A117.1 requirements in Section 608.7. Type B units do not have a requirement for an opening width of the shower compartment door (2017 ICC A117.1 Section 1104.5.2 and 1004.11.3.1.3.3). This change to the exceptions in this section would protect remodelers who do work on Type B or non-accessible bathrooms with limited space and without having to make adjustments such as moving the walls of a shower unit to accommodate a 20” clear width door opening or to change to enclosure to a swinging instead of a sliding door. This would be an unnecessary additional cost. This width has never been identified as a safety hazard.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will decrease the cost of construction
This will allow for standard sliding shower doors instead of requiring swinging doors on shower compartments. Swinging doors typically also need a larger room size.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because the added exception 12 allowed for sliding doors on standard 36 inch wide showers. These showers cannot make the 20" minimum width in exception 11. There was concern that this needs to be coordinated with IPC Section 421.4.2. (Vote: 10-4)

Public Comments

Public Comment 1

Proponents: Richard Williams, CWA Consultants, Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.1.1 Size of doors . The required capacity of each door opening shall be sufficient for the*occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width o 32 inches (813 mm). In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a minimum clear opening width of $41^1/_2$ inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an*Accessible unit*, *Type A unit* or *Type B unit*, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident*sleeping units* that are not required to be an*Accessible unit* shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
5. The maximum width of door leaves in*power-operated doors* that comply with Section 1010.3.2 shall not be limited.
6. Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).
7. In *dwelling and sleeping units* that are not required to be*Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).
8. In Groups I-1, R-2, R-3 and R-4, in*dwelling and sleeping units* that are not required to be Accessible, Type A or*Type B units*, the minimum clear opening widths shall not apply to interior egress doors.
9. Door openings required to be*accessible* within *Type B units* intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m^2) in area shall have a maximum width of 60 inches (1524 mm) nominal.
11. Doors serving sauna compartments, toilet compartments or dressing, fitting or changing compartments that are not required to be accessible shall have a minimum clear opening width of 20 inches (508 mm).
12. Door serving shower compartments ~~in other than Accessible units or Type A units are not required to provide a minimum clear opening widthwidth.~~ shall comply with Section 421.4.2 of the International Plumbing Code.

Commenter's Reason: This proposal attempts to clarify requirements for shower doors by removing them from Exception 11 and adding a new exception specific to shower compartments. In doing so, it creates confusion by including Accessible units and Type A units found in R occupancies to a section that previously only addressed accessible spaces in commercial buildings. In fact it now only addresses Accessible units and Type A units. Because of the the way it is worded, this proposal removes door opening width requirements for shower doors in some accessible shower areas. **This means that this section now indicates there is no minimum width requirement for shower doors in single user shower compartments - whether they are accessible or not – and this is clearly not correct.**
One reason cited for revising exception 11 is that because a 20” minimum clear opening is currently required for doors serving non-accessible single shower compartments, that minimum width requirement would conflict with a sliding door on a standard 36”x36” shower compartment. This is not necessarily a conflict, it merely means that it is not possible to install a sliding door where a 36” width is provided because it will not provide the minimum required width. In these situations, a hinged door would be required in order to provide the minimum width. This is no different than any other area of the building where a sliding door is allowed: if there is not enough physical space to install the sliding door to allow for the required clear width, then a hinged door would instead be required.

Exception 12 also does not include Type B units along with Accessible units and Type A units. This means a minimum width requirement would not apply to Type B units. The reason statement claims Type B units do not have a requirement for an opening width of the shower door compartment, per sections 1104.5.2 and 1004.11.3.1.3.3, but this is not entirely accurate. Section 1104.5.2 contains an exception that states doors that are part of a shower door assembly shall not be required to comply with minimum width requirements. Section 1104.11.3.1.3.3 sets a minimum opening width of 36” for shower compartments, but it allows for shower door assemblies to be installed in shower compartments as long as these assemblies can be removed without removal or replacement of the surrounding walls and floor to which it is affixed. This is an important distinction from other shower areas that would allow for any framed opening width less than 36" to accommodate a shower door and the author of this proposal does not seem to acknowledge this:

“…This change to the exceptions in this section would protect remodelers who do work on Type B or non-accessible bathrooms with limited space and without having to make adjustments such as moving the walls of a shower unit to accommodate a 20”clear width door opening or to change to enclosure to a swinging instead of a sliding door. This would be an unnecessary additional cost. This width has never been identified as a safety hazard.”

The reference will indicate the minimum width requirement for most shower doors in the IPC. Also, while we certainly do not think it was the intent of the author of this proposal, exception 12 eliminates the minimum width requirement for shower doors in ACCESSIBLE SHOWER COMPARTMENTS other than those in Accessible units and Type A units. This is clearly not permitted.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Final Hearing Results

E40-21	AMPC1

E43-21

Original Proposal

IBC: SECTION 202 (New), 1010.2.1, 1010.2.4, Table 1010.2.4 (New), 1010.2.5 (IFC:[BE] SECTION 202 (New), 1010.2.1, 1010.2.4, Table 1010.2.4 (New), 1010.2.5)

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Add new definition as follows:

AUTOMATIC FLUSH BOLT

.
Door locking hardware, installed on the inactive leaf of a pair of doors, which has a bolt that is extended automatically into the door frame or floor when the active leaf is closed after the inactive leaf, and which holds the inactive leaf in a closed position. When the active leaf is opened, the automatic flush bolt retracts the bolt or rod allowing the inactive leaf to be opened (see CONSTANT LATCHING BOLT, DEAD BOLT, MANUAL BOLT).

CONSTANT LATCHING BOLT

.
Door locking hardware installed on the inactive leaf of a pair of doors, which has a bolt that automatically latches into the door frame or the floor, and which holds the inactive leaf in a closed position. The latch bolt is retracted manually to allow the inactive leaf to be opened.

DEAD BOLT

.
Door locking hardware with a bolt which is extended and retracted by action of the lock mechanism (see AUTOMATIC FLUSH BOLT, CONSTANT LATCHING BOLT, MANUAL BOLT).

MANUAL BOLT

.
Door locking hardware operable from one side of the door, or from the edge of a door leaf, with a bolt or rod extended and retracted by manual movement of the bolt or rod, such as a manual flush bolt or manual surface bolt (see AUTOMATIC FLUSH BOLT, CONSTANT LATCHING BOLT, DEAD BOLT).

Revise as follows:

1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. *Manual bolt* locks are not permitted.

Exceptions:

1. Places of detention or restraint.
2. Where ~~manually operated~~ *manual bolt* locks are permitted by Section ~~1010.2.5.~~ 1010.2.4 Item 4.
3. Doors with *automatic flush bolts* as permitted by Section 1010.2.4, Item 4.
4. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.

2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.

3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   3.1. The locking device is readily distinguishable as locked.

   3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.3. The use of the key-operated locking device is revocable by the *building official* for due cause.

4. ~~Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.~~ *Manual bolt* locks, *automatic flush bolts*, and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided the inactive leaf having a *manual bolt* lock, *automatic flush bolt*, or *constant latching bolt* does not have a doorknob, panic hardware, or similar operating hardware.

5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, *dead bolt*, *manual bolt*, or security chain, provided such devices are openable from the inside without the use of a key or tool.

6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.

7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shll not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Add new text as follows:

TABLE 1010.2.4 MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WHERE A PAIR OF DOORS WITH AN ACTIVE LEAF AND INACTIVE LEAF SERVE THE FOLLOWING:	OCCUPANT LOAD OF SPACE SERVED BY THE PAIR OF DOORS	THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH SECTION 716	PERMITTED USES OF MANUAL BOLT LOCKS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.		
			Manual flush bolts or manual surface bolts with manual extension and retraction of bolt.	Automatic flush bolts with automatic extension and retraction of bolt by action of active leaf.	Constant latching bolts with automatic latching and manual retraction of bolt or latch.
Group B, F, or S occupancy	Less than 50	NO	P	P	P
		YES	NP	P[b]	P
Group B,F, or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, and where the inactive leaf is not needed to meet egress capacity requirements.	Occupant load served by the active leaf.	NO	P	P	P
		YES	NP	P[b]	P
Patient care rooms in Group I-2 occupancies, and where the inactive leaf is not needed to meet egress capacity requirements.	Occupant load served by the active leaf.	NO	NP	P[b]	P
		YES	NP	P[b]	P
Ooccupancies where panic hardware is not required, the egress doors are used in pairs, and where both the active and inactive leafs are required to meet egress capacity requirements.	Occupant load served by both leafs.	NO	NP	P	NP
		YES	NP	P[b]	NP
Storage or equipment rooms.	Occupant load served by the active leaf.	NO	P[a]	P	P
		YES	P[a]	P	P

P - Permitted; NP - Not permitted.

a. Not permitted in Group I-2 where corridor doors are required to be positive latching, and the storage or equipment room door is in the corridor.

b. Permitted where both doors are self-closing or automatic-closing, and have a coordinator that causes the inactive leaf to be closed prior to the active leaf.

Delete without substitution:

~~**1010.2.5 Bolt locks.** Manually operated flush bolts or surface bolts are not permitted~~.

~~**Exceptions:**~~

1. ~~On doors not required for egress in individual *dwelling units* or *sleeping units*~~.
2. ~~Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf.~~
3. ~~Where a pair of doors serves an *occupant load* of less than 50 persons in a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall not contain doorknobs, *panic* bars or similar operating hardware.~~
4. ~~Where a pair of doors serves a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf provided that such inactive leaf is not needed to meet egress capacity requirements and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The inactive leaf shall not contain doorknobs, *panic* bars or similar operating hardware~~.
5. ~~Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge- or surface-mounted bolts are permitted on the inactive leaf provided that the inactive leaf is not needed to meet egress capacity requirements and the inactive leaf shall not contain doorknobs, *panic* bars or similar operating hardware.~~

Reason: The IBC is rather confusing regarding dead bolts, manual bolt locks, and automatic flush bolts leading to significant variability in interpretations and application of the code.
This proposal offers four definitions, and revises sections of the IBC where these hardware items are addressed with requirements.

The most significant revision is to incorporate all the requirements of Section 1010.2.5 into Sections 1010.2.1 and 1010.2.4.

Here's what happened with requirements and exceptions of 1010.2.5:

- The charging language that “manually operated flush bolts and surface bots are not permitted” is revised based on the proposed definition of “manual bolt” and included in the charging language of 1010.2.1. Exception 2 of 1010.2.1 was also revised based on the

definition of “manual bolt”.
- Exception 1 of 1010.2.5 is included in revised 1010.2.4 Item 5 with inserting “manual bolt” in that item.
- Exceptions 2 through 5 of 1010.2.5 are included in proposed Table 1010.2.4. Item 4 of 1010.2.4 is revised to reference Table 1010.2.4.

The applications in Exceptions 2 through 5 of 1010.2.5 are incorporated into proposed Table 1010.2.4. Also included in this table is Item 4 of 1010.2.4, which is an application where automatic flush bolt are acceptable: Spaces served by egress doors in pairs where the doors are not required to be equipped with panic hardware, and both door leafs are used for egress capacity.

Also, doors required to comply with IBC Section 716 (opening protectives) are also required to be self-latching or automatic latching. Proposed Table 1010.2.4 includes this determining factor as to what hardware may be used.

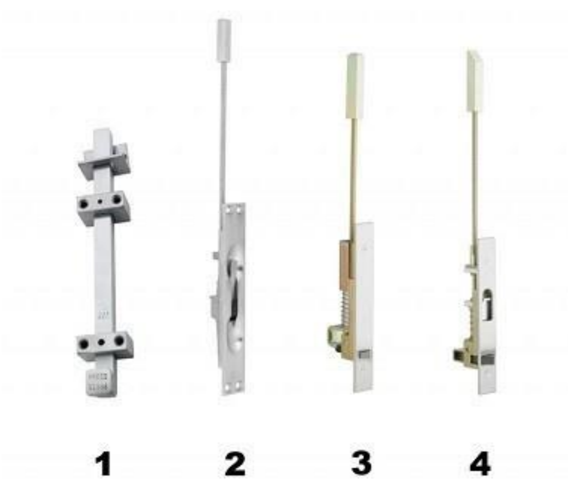
Several technical changes were incorporated in proposed Table 1010.2.4 that are not currently in these sections:·

- For Group I-2, the table clarifies manual bolt locks are not appropriate for use on patient care room doors where the door is required to be positive latching.
- The current requirements don’t differentiate between doors required to be fire-rated or not. That is, required to comply with Section 716 or not.
- For I-2 patient care rooms, Exception 5 of 1010.2.5 permitted what are called constant latching bolts. But the code was silent on other applications where these door hardware items may be desired and appropriate (where the inactive leaf is not needed for egress).
- Didn’t address using automatic flush bolts on the inactive leaf of patient care rooms, if the doors have closers and a coordinator which causes the inactive leaf to close prior to the active leaf.
- For storage and equipment rooms, manual bolts have been permitted, but automatic flush bolts and constant latching bolts would also be considered acceptable on the inactive leaf of storage and equipment rooms.

Manual bolt locks are typically located on the egress side of a door and have no operating parts on the other side of the door. Manual bolt are typically installed on the surface of the door panel, or installed flush with the edge or surface of the door

A dead bolt is manually extended from the egress side of the door by turning a thumb turn, or by manually pushing a button causing spring action to extend the lock bolt. Dead bolts are typically retracted (unlocked) from the egress side of the door by a thumb turn, or operation of the handle or lever. In very limited applications dead bolts may be extended and retracted by use of a key (see IBC Section 1010.2.4 Exception 3). On the ingress side of the door (the access side), dead bolts are typically extended (locked) and retracted (unlocked) by use of a key. Dead bolts are not considered to be manual bolt locks (see the definition for manual bolts).

The image below illustrates two manual bolts, an automatic flush bolt, and a constant latching (flush) bolt.



1 – Manual bolt mounted on the face of the door; the bolt is operated manually.

2 – Manual bolt mounted flush on the door edge; the bolt is projected and retracted manually using a small lever.

3 – Automatic flush bolt installed on the inactive leaf, and projected automatically when the active leaf closes, and retracted when the active leaf opens.

4 – Constant-latching (flush) bolt has a self-latching bolt which is retracted manually.

Dead bolt. Courtesy Allegion

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides updated guidance on “shall be permitted” locking hardware, and is an attempt to bring clarity to the requirements in the IBC.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved, however the committee felt that cleanup of the language for bolts is needed. In Table 1010.2.4, it is recommended to take out "inactive leaf is not needed to meet egress capacity requirements." Would this be confused with Group I-2 constant latching? (Vote : 10-3)

Public Comments

Public Comment 1

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.1 Unlatching. The unlatching of any door or ~~leaf for egress shall require not more than one motion in~~ leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and al~~locking devices.~~ locking devices. *Manual ~~bolt locks~~bolts* are not permitted.

Exceptions:

1. Places of detention or restraint.
2. ~~Where *manual bolt* locks are permitted by Section 1010.2.4 Item 4~~.
3. ~~Doors with *automatic flush bolts* as permitted by Section 1010.2.4, Item 4~~.

2.~~4.~~ Doors with *manual bolts, automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.

3.~~4.~~ Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches . Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   3.1. The locking device is readily distinguishable as locked.
   3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.3. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual* ~~*bolt*~~ ~~locks~~ *bolts*, *automatic flush bolts,* and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided the inactive leaf ~~having a *manual bolt* lock, *automatic flush bolt*, or *constant latching bolt*~~ does not have a doorknob, panic hardware, or similar operating hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, *dead bolt*, *manual bolt*, or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shll not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

~~TABLE 1010.2.4 MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS~~

APPLICATION WHERE A PAIR OF DOORS WITH AN ACTIVE LEAF AND INACTIVE LEAF SERVE THE FOLLOWING:	OCCUPANT LOAD OF SPACE SERVED BY THE PAIR OF	THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH	PERMITTED USES OF MANUAL BOLT LOCKS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.

	~~DOORS~~	~~SECTION 716~~	~~Manual flush bolts or manual surface bolts with manual extension and retraction of bolt.~~	~~Automatic flush bolts with automatic extension and retraction of bolt by action of active leaf.~~	~~Constant latching bolts with automatic latching and manual retraction of bolt or latch.~~
~~Group B, F, or S occupancy~~	~~Less than 50~~	NO	~~P~~	~~P~~	~~P~~
		YES	NP	~~P~~[b]	~~P~~
~~Group B,F, or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, and where the inactive leaf is not needed to meet egress capacity requirements.~~	~~Occupant load served by the active leaf.~~	NO	~~P~~	~~P~~	~~P~~
		YES	NP	~~P~~[b]	~~P~~
~~Patient care rooms in Group I-2 occupancies, and where the inactive leaf is not needed to meet egress capacity requirements.~~	~~Occupant load served by the active leaf.~~	NO	NP	~~P~~[b]	~~P~~
		YES	NP	~~P~~[b]	~~P~~
~~Ooccupancies where panic hardware is not required, the egress doors are used in pairs, and where both the active and inactive leafs are required to meet egress capacity requirements.~~	~~Occupant load served by both leafs.~~	NO	NP	P	NP
		YES	NP	~~P~~[b]	NP
~~Storage or equipment rooms.~~	~~Occupant load served by the active leaf.~~	NO	~~P~~[a]	~~P~~	~~P~~
		YES	~~P~~[a]	~~P~~	~~P~~

~~P - Permitted; NP - Not permitted~~.

a. ~~Not permitted in Group I-2 where corridor doors are required to be positive latching, and the storage or equipment room door is in the corridor.~~

b. ~~Permitted where both doors are self-closing or automatic-closing, and have a coordinator that causes the inactive leaf to be closed prior to the active leaf.~~

TABLE 1010.2.4

MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WITH A PAIR OF DOORS WITH AN ACTIVE LEAF AND INACTIVE LEAF	THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH SECTION 716	PERMITTED USES OF MANUAL BOLTS, AUTOMATIC FLUSH BOLTS, AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.		
		Surface or flush mounted manual bolts	Automatic flush bolts	Constant latching bolts
Group B, F, or S occupancies with occupant load less than 50.	No	P	P	P
	Yes	NP	NP[b]	P
Group B,F, or S occupancies where the building is equipped with automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not needed to meet egress capacity requirements.	No	P	P	P
	Yes	NP	NP[b]	P
Group I-2 patient care and sleeping rooms where inactive leaf is not needed to meet egress capacity requirements.	No	NP	NP[b]	P
	Yes	NP	NP[b]	P
Any ooccupancy where panic hardware is not required, egress doors are used in pairs, and where both leafs are required to meet egress capacity requirements.	No	NP	P	NP
	Yes	NP	NP[b]	NP
Storage or equipment rooms where the inactive leaf is not needed to meet egress capacity requirements.	No	P[a]	P	P
	Yes	P[a]	P	P

P - Permitted; NP - Not permitted.

a. Not permitted on corridor doors in Group I-2 occupancies where corridor doors are required to be positive latching.

b. Permitted where both doors are self-closing or automatic-closing, and are provided with a coordinator that causes the inactive leaf to be closed prior to the active leaf.

Commenter's Reason: This public comment proposes in 1010.2.1, revisions to combine Exception 2 with Exception 3. And revisions in 1010.2.1 and 1010.2.4 for consistent use of the proposed defined term "manual bolt".

This public comment also deletes and replaces proposed Table 1010.2.4 with a simpler table with minor revisions:

1. The left two columns of the originally proposed Table 1010.2.4 were combined into a single column to remove redundant text.
2. Also, where footnote "b" is used in the 2nd column from the right, the "P [b]" was revised to "NP [b]" for consistency with how footnote "a" is

used in the table.

3. Editing of column and row headings for simplicity and better consistency with the proposed definitions and text.

During the committee action hearing, there was discussion that manual bolts (manual bolt locks) may not be permitted by the proposed revisions as they are currently permitted by the IBC (e.g. on a single door). An explanation of how the proposal permit manual bolts:

1. The proposal deletes, from 1010.2.5, the current prohibition of manually operated flush bolts and surface bolts, and inserts this prohibition with minor revisions in 1010.2.1 stating "*Manual bolt* locks are not permitted.

2. However, there are three (was four) exceptions to 1010.2.1.

a. Exception 2 (was Exception 3), for individual dwelling units and sleeping units of Group R occupancies, sends the reader to Section 1010.2.4 Item 5.

b. Item 5 of 1010.2.4 permits installation of a night latch, dead bolt, or security chains on doors from individual dwelling units or sleeping units of Group R occupancies having an occupant load of 10 or less. This proposal, E43-21, adds "manual bolt" to this list of hardware items (see the original E43-21 proposal as Item 5 is not proposed for revisions with this public comment).

c. The net effect is manual bolts would be permitted on doors from individual dwelling units or sleeping units of Group R occupancies with an occupant load of 10 or less in the same applications where a dead bolt or night latch have been permitted.

d. Note the 2021 IBC in 1010.2.5 permits manually operated flush bolts or surface bolts on doors not required for egress in individual dwelling units or sleeping units. The revisions in this proposal permit manual bolts on doors – not required, or required, for egress – in individual dwelling units.

3. Note: The proposed definition for manual bolts indicates manual bolts can be either flush or surface mounted.

Also during the CAH, there was discussion about permitting / not permitting manual bolts, automatic flush bolts, and constant latching bolts on doors in the means of egress per proposed Table 1010.2.4. Perhaps an explanation of where the provisions in proposed Table 1010.2.4 came from may be helpful.

1. Item 4 in 1010.2.4 (revised in E43-21) permits manual bolts, automatic flush bolts, and constant latching bolts on the inactive leaf of a pair of doors in accordance with (proposed) Table 1010.2.4 provided the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

a. Do note Item 4 applies only to the inactive leaf of a pair of doors.

2. Proposed Table 1010.2.4, in the title of the table and in the heading of the right three columns, identifies the permitted uses of manual bolts, automatic flush bolts, and constant latching bolts on the inactive leaf of a pair of doors.

3. In proposed Table 1010.2.4,

a. Starting with the right-hand column of Table 1010.2.4, constant latching bolts, which have automatic latching and manual retraction of the bolt or latch, are proposed to be permitted:

i. On the inactive leaf where that inactive leaf is not required for egress capacity in B, F, and S occupancy groups (see deleted Exception 4 of Section 1010.2.5).

ii. On the inactive leaf of group I-2 patient care room doors (see deleted Exception 5 of Section 1010.2.5).

iii. On the inactive leaf of storage and equipment room doors where the occupant load is served by the active leaf (see deleted Exception 2 of Section 1010.2.5 – constant latching bolts release manually similar to manual bolts).

b. Automatic flush bolts, which are installed on the inactive leaf have automatic extension and have automatic retraction of the bolt by action of the active leaf, are proposed to be permitted

i. On the inactive leaf of a pair of doors in B, F, and S occupancy groups where the doors are not required to comply with IBC Section 716 for opening protectives (see deleted Exception 4 of Section 1010.2.5).

ii. For doors required to comply with 716 which are required elsewhere in the IBC to be positive latching, automatic flush bolts are not permitted on the inactive leaf unless the pair of doors meet the requirements of proposed footnote "b" requiring a coordinator to ensure the inactive leaf is closed prior to the active leaf.

iii. On doors to I-2 patient care rooms where the inactive leaf is not needed for egress capacity (see deleted

Exception 4 of Section 1010.2.5).

iv. For storage or equipment rooms, wherever a manual bolt would be permitted on the inactive leaf, an automatic flush bolt should also be permitted (see deleted Exception 2 of Section 1010.2.5).

c. Surface or flush mounted manual bolts are permitted

i. On the inactive leaf in B, F, and S occupancy groups only where the inactive leaf is not needed for egress capacity (see deleted Exception 4 of Section 1010.2.5).

ii. On the inactive leaf of storage and equipment room doors where the occupant load is served by the active leaf (see deleted Exception 2 of Section 1010.2.5).

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal provides updated guidance on “shall be permitted” locking hardware, and is an attempt to bring clarity to the requirements in the IBC.

Final Hearing Results

E43-21	AMPC1

E44-21

Original Proposal

IBC: 1010.2.3 (IFC:[BE]1010.2.3)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1010.2.3 Hardware height. Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor. ~~Locks used only for security purposes and not used for normal operation are permitted at any height.~~

Exceptions: ~~**Exception:** Access doors or gates in barrier walls and fences protecting pools, spas and hot tubs shall be permitted to have operable parts of the latch release on self-latching devices at 54 inches (1370 mm) maximum above the finished floor or ground, provided that the self-latching devices are not also self-locking devices operated by means of a key, electronic opener or integral combination lock.~~

1. Locks used only for security purposes and not used for normal operation are permitted at any height.
2. Where the International Swimming Pool and Spa Code requires restricting access to a pool, spa, or hot tub, on the ingress side of the door or gate providing access to a pool, spa, or hot tub, the operable parts of the latch release on self-latching devices shall be permitted to be at 54 inches (1370 mm) maximum above the finished floor or ground, provided that the self-latching device is not a self-locking devices operated by means of a key, electronic opener or integral combination lock.

Reason: It should be noted this 2nd exception – current, and as revised – does not include self-locking hardware operated by a key or similar device on the ingress side of a door or gate providing access to a pool, spa, or hot tub, which are required to comply with the 34" to 48" AFF requirement. Why? Occupants that may be at risk because of the pool, spa, or hot tub (i.e. children) would not have access to the key, magnetic card, code, etc. needed to unlock the door or gate controlling access to a pool, spa, or hot tub.
The last sentence of the charging language is actually an exception to the first sentence.

What was an exception is now the 2nd exception with revisions to communicate the context: the access side (ingress side) of doors or gates restricting access to a pool, spa, or hot tub. The context is a big part of the challenge of understanding this "shall be permitted" language allowing the operable devices of non-locking door hardware on doors or gates providing access to pools, spas, or hot tubs to be up to 54" above the floor. Our "code brains" are conditioned to look at door locking provisions from the egress side perspective. BUT, these "shall be permitted" provisions are on the ingress side of the door which provides access to the pool, spa, or hot tub.

The revised exception to 1010.2.3 retains the option of installing non-locking latching hardware on the access side (ingress side) of a door or gate providing access to a pool, spa, or hot tub up to 54" above the finished floor, which may be out of reach to smaller children.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification, no technical change is intended.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1010.2.3 Hardware height. Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor.

Exceptions:

1. Locks used only for security purposes and not used for normal operation are permitted at any height.
2. Where the International Swimming Pool and Spa Code requires restricting access to a pool, spa, or hot tub,~~on the ingress side of the door or gate providing access to a pool, spa, or hot tub, the operable parts of the latch release on self-latching devices shall be permitted to be at~~ and where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such mechanism shall be located above the finished floor or ground surface, not less than 52 inches (1219 mm) and not greater than 54 inches (1370 mm) ~~maximum above the finished floor or ground~~, provided that the ~~self-latching device~~ latch release mechanisms is not a self-locking ~~devices~~ type such as where the lock is operated by means of a key, electronic opener or the entry of a combination into an integral combination lock.

Committee Reason: The modification matches the 2021 ISPSC requirements. The proposal clarifies that this applies to the outside of the barrier instead of the exit side. The coordinates with the accessibility requirements in the ICC A117.1 and the 2010 ADA and allows for a height that keeps the latches outside the reach of children for safety. (Vote: 13-0)

Final Hearing Results

E44-21	AM

E45-21

Original Proposal

IBC: 1010.2.4 (IFC:[BE]1010.2.4)

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Revise as follows:

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main ~~door or~~ doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

   3.2~~3.1.~~ The locking device is readily distinguishable as locked.

   3.3~~3.2~~. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.4~~3.3~~. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the building for*means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.
    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Reason: What is now Item 3 in 2021 IBC Section 1010.2.4 permits doors to be locked not allowing ingress or egress from certain occupancies while the space is not occupied. Item 3 was revised per proposal E63-12 to recognize the main doors to a space may not be exterior doors – for example doors to a tenant space from an indoor shopping mall corridor. Unfortunately, removing the word “exterior” in what is now Item 3 has resulted in BHMA members seeing interpretations that the “main doors” can be just about any door to a space within a building. Our understanding is that this broad interpretation and application of the provisions in Item 3 are not as intended with the revisions approved in proposal.
This proposal attempts to clarify Item 3 is limited to the main exterior doors a space, or the main doors to the tenant space

Cost Impact: The code change proposal will increase the cost of construction
The code proposal may increase the cost of construction if doors which were capable of being locked with a key-operated lock on the egress side would not be permitted to be locked, and a different, higher cost, lock was needed. On the other hand, this proposal may decrease the cost of construction as the locations where the key cylinder locks may be permitted may decrease slightly.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved. The proposed text as written appears to not be applicable to spaces with one means of egress. There was a question as to if there could be more than one door in the path of egress travel - from the tenant and then again from the building. (Vote: 9-4)

Public Comments

Public Comment 1

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.4 Locks and latches . Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main <u>door or</u> doors are permitted to be equipped with key-operated locking devices from the egress side provided:
    3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
    3.2. The locking device is readily distinguishable as locked.
    3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
    3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.
    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Commenter's Reason: Item 3 in 1010.2.4 permits the main doors of a space to be locked with a key operated lock preventing egress (and ingress) when locked. Traditionally, this provision was applied to the main exterior doors to a business or restaurant, and the main doors would be locked all times other than business hours. Employees of the business or restaurant would know to enter or leave by one of the other doors, or a few employees would have the key needed to unlock the doors for egress.
Prior to the 2015 IBC, the applicability of Item 3 was limited to the **main exterior doors** of a building for the listed occupancies. And, the sign required by this section stated: THIS DOOR TO REMAIN UNLOCKED WHEN **THIS BUILDING** IS OCCUPIED.

However, for the 2015 IBC, proposal E63-12, as modified by the committee, revised item 3 to be applicable to the **main doors** to a space for the same listed occupancies. And, the sign required by this section stated: THIS DOOR TO REMAIN UNLOCKED WHEN **THIS SPACE** IS OCCUPIED. The proponent’s intent of E63-12 was to permit the provisions of Item 3 to be applicable to, for example, where the main doors to a restaurant open into a mall.

Unfortunately, over the last several years, we have been observing that Item 3 is being interpreted as broadly as written: any doors that could be described as the main doors, to any space in the listed occupancies, regardless of the size or use of the space and regardless of how far into the bowels of the building, could be locked with a key operated lock preventing ingress **and / or egress**.

This proposal is intended to bring the scope of the applicability of Item 3 to be more closely aligned to the proponents stated intent of E63-12. Item 3 would be applicable to the **main exterior doors to the building**, **or** the doors are the **main doors to the tenant space**.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
This code proposal may increase the cost of construction if doors which were capable of being locked with a key-operated lock on the egress side would not be permitted to be locked, and a different, higher cost lock was needed. On the other hand, this proposal may decrease the cost of construction as the locations where the key cylinder locks may be permitted may decrease.

Final Hearing Results

E45-21	AMPC1

E46-21

Original Proposal

IBC: 1010.2.4 (IFC:[BE]1010.2.4)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   3.1. The locking device is readily distinguishable as locked.
   3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.3. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies ~~having an *occupant load* of 10 or less~~ <u>permitted to have a single exit in accordance with Section 1006.2.1 or 1006.3.4</u> are permitted to be equipped with a night latch, dead bolt or security chain<u>, that require a second releasing motion,</u> provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the building for*means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shll not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Reason: The intent of this provision is to coordinate with the change in Table 1006.2 for single exit dwelling units in E17-15 which changed R-2, R-3 and R-4 requirements for single exit dwelling units from 10 to 20 occupants. This was essentially moving an existing exception for sprinklered dwelling units into the table since all Group R are sprinklered. It is appropriate to coordinate Section 1010.2.4 with this allowance to allow deadbolts to be installed for security on these doors. In order to not have a conflict in the future if this changes again, rather than change the number of occupant for individual dwelling units it is more appropriate to reference the section. The reference to Section 1006.3.4 is to allow for the individual dwelling units addressed in Exceptions 4 and 5.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a coordination of current requirement.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it coordinated with E17-15 and Table 1006.2. (Vote 13-0)

Final Hearing Results

E47-21

Original Proposal

IBC: 1010.2.7 (IFC:[BE]1010.2.7)

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

Revise as follows:

1010.2.7 Stairway doors. Interior *stairway* means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. *Stairway* exit doors are permitted to be locked from the side opposite the egress side, provided that they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon <u>one of the following:</u>
   - <u>3.1.</u> <u>A</u> ~~a~~ signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
   - <u>3.2.</u> <u>Activation of a fire alarm signal when a fire alarm system is present in an area served by the stairway</u>.
   - <u>3.3.</u> <u>Failure of the power supply.</u>
4. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit *stairway* where permitted in Section 1006.3.4.

Reason: This is an important code change for non-high rise buildings that propose to lock stairway doors from the side opposite to the side from which egress is sought. It is not unusual during an emergency or power outage that building occupants need to access other stories of a building through the stairways. The IBC seems to include provisions for unlocking of locked stairway doors by fire fighting personnel when they arrive at the scene of the incident and assess the situation. that might be quite some time for someone trapped in a vertical exit way that may for example blocked at the bottom.
Frequently door locking systems are connected to emergency backup power sources or batter systems and as a result door do not unlock during an emergency. For example, during a power outage, fire department personnel may need to access floors from stairways to perform rescue or evacuation operations for elderly persons who may have difficulty evacuating the building. My jurisdiction had a vandalism incident where hose valves for standpipes serving an 8 level plus two basement building were simultaneously opened, and the fire department was not able to access stories from the stairwell side. The remote unlocking location was not accessible due to flooding and water flow put the building into alarm and evacuation was initiated. Occupants were trapped in the stairways due to rising water level at the discharge level. While not common, this incident highlights that there may be cases where occupants may require options prior to the arrival of fire rescue personnel at a fire command center or other central location in a building.

The proposed code change does not intend to trigger a fire alarm system and is purposefully vague on whether the locking system is power by local battery backup or an emergency power circuit. This code change was adapted based on a local amendment adopted in Clark County Nevada that is attached for reference.”

Section 1010.1.9.12

Amend Section 1010.1.9.12 to read as follows:

1010.1.9.12 Stairway doors. Interior *stairway means of egress* doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Unchanged*
2. *Unchanged*
3. *Stairway* exit doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side, unlocked simultaneously without unlatching upon a signal from the *fire command center*, if present, or a signal by emergency personnel from a location inside ~~to~~ the building.
4. Unchanged
5. Unchanged
6. Upon approval of the *building official*, *stairway* doors opening directly into *sleeping units*, *dwelling units* or tenant spaces are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side. The doors are permitted to unlock without unlatching only upon signal from the *fire command center*, if present, or a signal by emergency personnel from an *approved* location inside the building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost impact should be minimal since the stairway doors are controlled remotely and therefore require an additional signal. Backup power is usually at the lock so when power is lost it unlocks if the battery is depeltd..

Staff Note: Proposals E47-21, G60-21 and G61-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1010.2.7Stairway doors. Interior *stairway* means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. *Stairway* exit doors are permitted to be locked from the side opposite the egress side, provided that they are openable from the egress side and capable of being unlocked simultaneously without unlatching when ~~upon~~ any ~~one~~ of the following conditions occur:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a ~~A~~ signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.

   3.2. ~~Shall unlock simultaneously upon activation Activation~~ of a fire alarm signal when a fire alarm system is present in an area served by the stairway.

   3.3. Shal unlock upon failure ~~Failure~~ of the power supply to the electric lock or the locking system.

4. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.

5. *Stairway* exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit *stairway* where permitted in Section 1006.3.4.

Committee Reason: The modification was approved because it makes the locks failsafe. This proposal address non-high-rise buildings and adds 3 options for compliance. (Vote: 10-2)

Final Hearing Results

E47-21	AM

E48-21

Original Proposal

IBC: 1010.2.9 (IFC:[BE]1010.2.9)

Proponents: Daniel Willham, Fairfax County, Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Building Code

Revise as follows:

1010.2.9 Panic and fire exit hardware. Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an *occupant load* of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than*panic hardware* or *fire exit hardware*.

Exceptions:

1. A main exit of a Group A occupancy shall be permitted to have locking devices in accordance with Section 1010.2.4, Item 3.
2. Doors provided with *panic hardware* or *fire exit hardware* and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.2.11~~ or 1010.2.12~~.
3. Exit access doors serving occupied exterior areas shall be permitted to be locked in accordance with Section 1010.2.4, Item 8.
4. Courtrooms shall be permitted to be locked in accordance with Section 1010.2.13, Item 3.

Reason: A recent change added sensor released doors to be used where panic hardware is required. Some have understood this section to not require panic hardware when sensor released locks are used, despite it explicitly stating that it applies to doors provided with panic hardware. Section 1010.2.12 of the code recognizes that motion sensors are not reliable when it comes to life-safety since a wall mounted push-button release is required adjacent to the door for use when the motion detector fails to release the door. This is not functionally equivalent to the reliability of listed panic hardware and is not a suitable a substitute.

Cost Impact: The code change proposal will increase the cost of construction
A significant increase or decrease in cost is not expected since listed hardware is required either way. This change would revert the code to the 2015 language.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The proposal was approved because it simplifies operation and addresses hazards other than fire. (Vote: 9-3)

Final Hearing Results

E48-21	AS

E49-21

Original Proposal

IBC: 1010.2.10 (New) [IFC:[BE]1010.2.10 (New)]

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Add new text as follows:

1010.2.10 Access control door locking systems.

Where electrical door locking systems that prevent or control ingress to a space are incorporated in a locking system of a door in the means of egress, the locking system shall comply with Section 1010.2.12, 1010.2.13, 1010.2.14, 1010.2.15, or 1010.2.16, or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

Reason: Modeled from and similar to current 2021 IBC Section 1010.2.10 Monitored or recorded egress, this proposed section describes how access control systems – ingress control systems – may be incorporated into the locking system of a door in the means of egress. This proposed section of the IBC is technically not necessary in the IBC as the IBC is essentially silent regarding requirements for ingress control systems (access control systems). In other words, what is not prohibited by the code is, by default, permitted.

However, BHMA members are being drawn into conversations and debates with code officials as to what section(s) of the IBC with requirements for door locking arrangements are applicable to electrical locking systems which control or prevent **ingress** to a space (access control systems). This proposed new section is intended to prevent these debates by requiring doors in the means of egress which incorporate ingress control systems (access control systems) to require, on the egress side of the door, the door to be readily openable without the use of a key or special knowledge or effort, or comply with any one of the “shall be permitted” electrical locking systems.

FYI: with relatively few exceptions, the code does not regulate ingress control / access control into a building or room. For most doors, the building owner / occupant can do as desired regarding ingress control (access control) as long as all the requirements for egress are satisfied. The code does have requirements for stairway re-entry into the building (IBC Section 1010.2.7 Stairway doors), for authorized personnel access into locked occupied rooms (IBC Section 1010.2.8 Locking arrangements in educational occupancies), and for access to pools (IBC Section 1010.2.3, and ISPSC).

Cost Impact: The code change proposal will increase the cost of construction
This proposal would not increase the cost of construction as ingress control systems are not required by the IBC.

Public Hearing Results

Committee Action	**Disapproved**

Committee Reason: The proposal was disapproved because Chapter 10 is for means of egress and this proposal is about entering, not exiting. (Vote: 11-3)

Public Comments

Public Comment 1

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1010.2.10 Monitored or recorded egress, and access control systems. Where electrical systems that monitor or record egress activity are incorporated, or where the door has an access control system, the locking system on the egress side of the door shall comply with Section 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.14 or 1010.2.15 or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

Commenter's Reason: The proposed revisions to 2021 IBC Section 1010.2.10 adds access control systems to this section of the code, and how monitored egress systems and access control systems must “play nice” with door hardware and locking systems on the egress side of a door in the means of egress.
The proposed revisions address doors which incorporate access control systems to require, on the egress side, the door to be readily openable without the use of a key or special knowledge or effort, or comply with any one of the “shall be permitted” electrical locking systems of 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.14 or 1010.2.15.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Since access control systems are not required by the code, this proposal would not be expected to increase the cost of construction.

Final Hearing Results	
E49-21	AMPC1

E51-21

Original Proposal

IBC: 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.13.1, 1010.2.14 (IFC:[BE]1010.2.11, 1010.2.12, 1010.2.13, 1010.2.13.1, 1010.2.14)

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Revise as follows:

1010.2.11 Door hardware release of electrically locked egress doors. Door hardware release ~~of electric~~ electrical locking systems shall be permitted on doors in the *means of egress* in any occupancy except Group H where installed and operated in accordance with all of the following:

1. The door hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The door hardware is capable of being operated with one hand and shall comply with Section 1010.2.1.
3. Operation of the door hardware directly interrupts the power to the electric lock and unlocks the door immediately.
4. Loss of power to the electrical locking system automatically unlocks the ~~door~~ electric lock.
5. Where *panic* or *fire exit hardware* is required by Section 1010.2.9, operation of the *panic* or *fire exit hardware* also releases the electric lock.
6. The locking system units shall be *listed* in accordance with UL 294.

1010.2.12 Sensor release of electrically locked egress doors. Sensor release ~~of electric~~ electrical locking systems shall be permitted on doors located in the *means of egress* in any occupancy except Group H where installed and operated in accordance with all of the following criteria:

1. The sensor shall be installed on the egress side, arranged to detect an occupant approaching the doors, and shall cause the electrical locking system to unlock the electric lock.
2. ~~The electric locks shall be arranged to unlock by a signal from or loss of power to the sensor.~~ Upon a signal from a sensor or loss of power to the sensor, the electrical locking system shall unlock the electric lock.
3. Loss of power to the electric lock or electrical locking system shall automatically unlock the electric locks.
4. The doors shall be arranged to unlock the electric lock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads “PUSH TO EXIT.” When operated, the manual unlocking device shall result in direct interruption of power to the electric lock—independent of other electronics—and the electric lock shall remain unlocked for not less than 30 seconds.
5. Activation of the building *fire alarm system*, where provided, shall automatically unlock the electric lock, and the electric lock shall remain unlocked until the *fire alarm system* has been reset.
6. Activation of the building *automatic sprinkler system* or fire detection system, where provided, shall automatically unlock the electric lock. The electric lock shall remain unlocked until the *fire alarm system* has been reset.
7. Emergency lighting shall be provided on the egress side of the door.
8. The door locking system units shall be *listed* in accordance with UL 294.

1010.2.13 Delayed egress. Delayed egress electrical locking systems shall be permitted ~~to be installed~~ on doors in the means of egress serving the following occupancies in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved automatic smoke* or *heat detection system* installed in accordance with Section 907.

1. Group B, F, I, M, R, S and U occupancies.
2. Group E classrooms with an *occupant load* of less than 50.
3. In courtrooms in Group A-3 and B occupancies, delayed egress electrical locking systems shall be permitted to be installed on exit or *exit access* doors, other than the main exit or *exit access* door, in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

1010.2.13.1 Delayed egress locking system. The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay ~~electronics~~ of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate free egress.
2. The delay ~~electronics~~ of the delayed egress electrical locking system shall deactivate upon loss of power ~~controlling~~ to the ~~lock~~ electrical locking system or electric lock ~~mechanism~~, allowing immediate free egress.
3. The delay of the delayed egress electrical locking system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay ~~electronics have~~ has been deactivated, rearming the delay electronics shall be by manual means only.

   Exception: Where *approved*, a delay of not more than 30 seconds is permitted on a delayed egress door.
5. The egress path from any point shall not pass through more than one delayed egress locking system.

   Exceptions:
   1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
   2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware.

   Exception: Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.
   1. For doors that swing in the direction of egress, the sign shall read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
   2. For doors that swing in the opposite direction of egress, the sign shall read, "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
   3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The delayed egress locking system units shall be *listed* in accordance with UL 294.

1010.2.14 Controlled egress doors in Groups I-1 and I-2. ~~Electric~~ Controlled egress electrical locking systems, ~~including electro-mechanical locking systems and electromagnetic locking systems,~~ where egress is controlled by authorized personnel, shall be permitted ~~to be locked~~ on doors in the *means of egress* in Group I-1 or I-2 occupancies where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved automatic smoke detection system* installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door's electric locks shall unlock on actuation of the *automatic sprinkler system* or *automatic smoke detection system*, allowing immediate free egress.
2. The door's electric locks shall unlock on loss of power ~~controlling~~ to the ~~lock~~ electrical locking system or to the electric lock ~~mechanism~~, allowing immediate free egress.
3. The ~~door~~ electrical locking system shall be installed to have the capability of ~~being unlocked~~ unlocking the electric locks by a switch located at the *fire command center*, a nursing station or other *approved* location. The switch shall directly break power to the electric lock.
4. A building occupant shall not be required to pass through more than one door equipped with a controlled egress locking system before entering an *exit*.
5. The procedures for unlocking the doors shall be described and *approved* as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the controlled egress electrical locking systems.
7. Emergency lighting shall be provided at the door.
8. The door locking system units shall be *listed* in accordance with UL 294.

Exceptions:

1. Items 1 through 4 shall not apply to doors to areas occupied by persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric or cognitive treatment area.
2. Items 1 through 4 shall not apply to doors to areas where a *listed* egress control system is utilized to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 *hospital*.

Reason: Proposing editorial revisions to the four “shall be permitted” electrical locking systems to to improve the grammar of these sections, and clarify the requirements of each system.
Some of the revisions were made from this grammar perspective:

Electrical means of or relating to electricity, such as an electrical system or an electrical fault.

Electric is typically used when referring to devices which run on electricity, such as an electric lock.

Other revisions are intended to reduce ambiguity of the requirements of these electrical locking systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There's a possibility this proposal may decrease the cost of construction if it helps with consistency of interpretation, application, and enforcement of these electrical door locking provisions. This proposal is intended to not change the technical requirements of these electrical locking systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal adds a technical clarification and provides consistent locking mechanism terminology. (Vote: 14-0)

Final Hearing Results

E51-21	AS

E52-21

Original Proposal

IBC: 1010.2.11, 1010.2.12, 1010.2.13.1, 1010.2.14, UL Chapter 35 (New) [IFC:[BE]1010.2.11, 1010.2.12, 1010.2.13.1, 1010.2.14, UL Chapter 80 (New)]

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Revise as follows:

1010.2.11 Door hardware release of electrically locked egress doors. Door hardware release of electric locking systems shall be permitted on doors in the *means of egress* in any occupancy except Group H where installed and operated in accordance with all of the following:

1. The door hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The door hardware is capable of being operated with one hand and shall comply with Section 1010.2.1.
3. Operation of the door hardware directly interrupts the power to the electric lock and unlocks the door immediately.
4. Loss of power to the electric locking system automatically unlocks the door.
5. Where *panic* or *fire exit hardware* is required by Section 1010.2.9, operation of the *panic* or *fire exit hardware* also releases the electric lock.
6. The ~~locking system units~~ electro-mechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034.

1010.2.12 Sensor release of electrically locked egress doors. Sensor release of electric locking systems shall be permitted on doors located in the *means of egress* in any occupancy except Group H where installed and operated in accordance with all of the following criteria:

1. The sensor shall be installed on the egress side, arranged to detect an occupant approaching the doors, and shall cause the electric locking system to unlock.
2. The electric locks shall be arranged to unlock by a signal from or loss of power to the sensor.
3. Loss of power to the lock or locking system shall automatically unlock the electric locks.
4. The doors shall be arranged to unlock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads “PUSH TO EXIT.” When operated, the manual unlocking device shall result in direct interruption of power to the electric lock—independent of other electronics—and the electric lock shall remain unlocked for not less than 30 seconds.
5. Activation of the building *fire alarm system*, where provided, shall automatically unlock the electric lock, and the electric lock shall remain unlocked until the *fire alarm system* has been reset.
6. Activation of the building *automatic sprinkler system* or fire detection system, where provided, shall automatically unlock the electric lock. The electric lock shall remain unlocked until the *fire alarm system* has been reset.
7. Emergency lighting shall be provided on the egress side of the door.
8. The ~~door locking system units~~ electro-mechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034.

1010.2.13.1 Delayed egress locking system. The delayed egress locking system shall be installed and operated in accordance with all of the following:

1. The delay electronics of the delayed egress locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate free egress.
2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.
3. The delayed egress locking system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.

   Exception: Where *approved*, a delay of not more than 30 seconds is permitted on a delayed egress door.
5. The egress path from any point shall not pass through more than one delayed egress locking system.

   Exceptions:
   1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
   2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware.

   Exception: Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.

   6.1. For doors that swing in the direction of egress, the sign shall read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.2. For doors that swing in the opposite direction of egress, the sign shall read, "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The ~~delayed egress locking system units~~electro-mechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034.

1010.2.14 Controlled egress doors in Groups I-1 and I-2. Electric locking systems, including electro-mechanical locking systems and electromagnetic locking systems, shall be permitted to be locked in the *means of egress* in Group I-1 or I-2 occupancies where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved automatic smoke detection system* installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door locks shall unlock on actuation of the *automatic sprinkler system* or *automatic smoke detection system*.
2. The door locks shall unlock on loss of power controlling the lock or lock mechanism.

3. The door locking system shall be installed to have the capability of being unlocked by a switch located at the *fire command center*, a nursing station or other *approved* location. The switch shall directly break power to the lock.
4. A building occupant shall not be required to pass through more than one door equipped with a controlled egress locking system before entering an *exit*.
5. The procedures for unlocking the doors shall be described and *approved* as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking systems.
7. Emergency lighting shall be provided at the door.
8. The ~~door locking system units~~ electro-mechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034.

Exceptions:

1. Items 1 through 4 shall not apply to doors to areas occupied by persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric or cognitive treatment area.
2. Items 1 through 4 shall not apply to doors to areas where a *listed* egress control system is utilized to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 *hospital*.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 1034-2011 Burglary-Resistant Electric Locking Mechanisms – with revisions through June 2020

Reason: This code change proposal will add an additional listing option to these four “shall be permitted” electrical locking systems for UL 1034. Listing to UL 1034 will provide an additional safety and performance certification option for the electro-mechanical or electromagnetic lock devices that typically is part of an electrical locking system.
These sections have created confusion for building designers specifying electric locking systems and for code officials approving systems for this application. The proposed revisions will help eliminate that confusion by allowing what is already available and commonly utilized for these applications. The addition of UL 1034 is also intended to provide clarity as to allow these code sections to match the certified products in use and available in the market.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It provides an additional standard by which to certify components already required to be listed. This may reduce the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it provides better terminology. (Vote: 14-0)

Final Hearing Results

E52-21 AS

E56-21

Original Proposal

IBC: 1010.2.15 (New), 1016.2, 3006.4; (IFC:[BE]1010.2.15 (New), 1016.2)

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Add new text as follows:

1010.2.15 Elevator lobby exit access doors. Electrically locked exit access doors providing egress from elevator lobbies shall be permitted where all the following conditions are met:

1. For all occupants of the floor, the path of exit access travel to not less than two exits is not required to pass through the elevator lobby.
2. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and an approved automatic smoke detection system in accordance with Section 907.
3. Activation of either the automatic sprinkler system or automatic smoke detection system shall automatically unlock the electric lock providing exit access from the elevator lobby, and the electric lock shall remain unlocked until the systems are reset.
4. The electric locks shall unlock on loss of power to the electric lock or electrical locking system.
5. The electric locks shall have the capability of being unlocked by a switch located at the fire command center, security station, or other approved location.
6. A two-way communication system connected to an approved constantly attended station installed in accordance with Sections 1009.8.1 and 1009.8.2, shall be located in the elevator lobby adjacent to the electrically locked exit access door. This constantly attended station shall have the capability of unlocking the electric locks of the elevator lobby exit access doors.
7. Emergency lighting shall be provided in the elevator lobby on both sides of the electrically locked door.
8. The door locking system units shall be listed in accordance with UL 294.

Revise as follows:

1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Where access to two or more exits or exit access doorways is required in Section 1006.2.1, access to not less than one of the required *exits* shall be provided without travel through the enclosed elevator lobbies required by Section 3006. Where the path of *exit access* travel passes through an enclosed elevator lobby, the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an*exit* is required by other sections of this code.
2. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an exit.

   Exception: *Means of egress* are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy where the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.

3. An *exit access* shall not pass through a room that can be locked to prevent egress.

   Exception: An electrically locked exit access door providing egress from an elevator lobby shall be permitted in accordance with Section 1010.2.15.

4. *Means of egress* from *dwelling units* or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
5. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

   Exceptions:

   1. *Means of egress* are not prohibited through a kitchen area serving adjoining rooms constituting part of the same*dwelling unit* or *sleeping unit*.
   2. *Means of egress* are not prohibited through stockrooms in Group M occupancies where all of the following are met:
      2.1. The stock is of the same hazard classification as that found in the main retail area.
      2.2. Not more than 50 percent of the*exit access* is through the stockroom.
      2.3. The stockroom is not subject to locking from the egress side.
      2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) *aisle* defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstructions.

3006.4 Means of egress. Elevator lobbies shall be provided with not less than one*means of egress* complying with Chapter 10 and other provisions in this code. Egress through an enclosed elevator lobby shall be permitted in accordance with Item 1 of Section 1016.2. Electrically locked exit access doors providing egress from elevator lobbies shall be permitted in accordance with Section 1010.2.15.

Reason: A number of jurisdictions across the country are including modifications in their building code to permit locking of exit access doors in elevator lobbies. These jurisdictions include California, Massachusetts, Houston, and Seattle. We're bringing this proposal forward in an effort to see if a consensus can be developed permitting electrical locking of exit access doors in elevator lobbies. The provisions proposed were developed through reviewing currently adopted provisions of other codes.
This proposal presents an alterative to the long-standing requirement that each elevator lobby has access to at least one exit complying with Chapter 10.

Proposed new Section 1010.2.15 includes specific requirements for where electrically locked exit access doors providing egress from elevator lobbies could be permitted.

The new exception in Section 1016.2, Item 3, is intended to address a potential internal conflict in the IBC.

The revision in Section 3006.4 provides the proposed alternative to requiring one means of egress from elevator lobbies. It should be noted that providing egress from an elevator lobby through tenant space(s) would typically provide access to two exits - because most tenant spaces would be required to have access to two exits.

The options presented by this proposal may be applicable to new buildings, and to build-out of floors in existing buildings, and may be most desirable where exit stairways are remote from the elevator lobby.

Cost Impact: The code change proposal will increase the cost of construction
This may increase the cost of construction. There would be an increase in cost of construction to comply with these requirements for exit access doors in elevator lobbies. On the other hand, adding this provision to the IBC may result in a decrease in the cost of construction by allowing alternative layouts of the floor.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1010.2.15 Elevator lobby exit access doors. Electrically locked exit access doors providing egress from elevator lobbies shall be permitted where all the following conditions are met:

1. For all occupants of the floor, the path of exit access travel to not less than two exits is not required to pass through the elevator lobby.

2. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and a fire alarm system in accordance with Section 907. Elevator lobbies shall be provided with an ~~approved~~ automatic smoke detection system in accordance with Section 907.

3. Activation of ~~either the automatic sprinkler system or automatic smoke detection~~ the building fire alarm system by other than a manual fire alarm box shall automatically unlock the electric ~~lock~~ locks providing exit access from the elevator ~~lobby~~ lobbies, and the electric ~~lock~~ locks shall remain unlocked until the fire alarm system is ~~are~~ reset.

4. The electric locks shall unlock on loss of power to the electric lock or electrical locking system.

5. The electric locks shall have the capability of being unlocked by a switch located at the fire command center, security station, or other approved location.

6. A two-way communication system ~~connected to an approved constantly attended station installed in accordance~~ complying with Sections 1009.8.1 and 1009.8.2, shall be located in the elevator lobby adjacent to the electrically locked exit access door and connected to an approved constantly attended station. This constantly attended station shall have the capability of unlocking the electric locks of the elevator lobby exit access doors.

7. Emergency lighting shall be provided in the elevator lobby on both sides of the electrically locked door.

8. The door locking system units shall be listed in accordance with UL 294.

Committee Reason: The modification to Item 2 and 3 corrects the language to remove the activation of the sprinklers and just requires an alarm. The modification to Item 6 is rearranged for clarity. The proposal was approved as it is a good solution to a common design. The is a good solution for mixed occupancy, multi-tenant buildings. This proposal combines several state modifications that allow this option. This solution also addressed emergencies other than fire. (Vote: 12-2)

Final Hearing Results

E56-21	AM

E58-21

Original Proposal

IBC: 1011.2 (IFC:[BE] 1011.2)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1011.2 Width and capacity. The required capacity of *stairways* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm). ~~See Section 1009.3 for *accessible means of egress stairways*.~~ The minimum width for stairways that serve as part of the accessible means of egress shall comply with Section 1009.3.

Exceptions:

1. *Stairways* serving an *occupant load* of less than 50 shall have a width of not less than 36 inches (914 mm).
2. *Spiral stairways* as provided for in Section 1011.10.
3. Where an incline platform lift or *stairway* chairlift is installed on *stairways* serving occupancies in Group R-3, or within *dwelling units* in occupancies in Group R-2, a clear passage width not less than 20 inches (508 mm) shall be provided. Where the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

Reason: The revised language would make the terminology consistent between this reference and the referenced Section 1009.3. Stairways are never considered to be part of an accessible route. They can serve as part of an accessible means of egress with assistance by emergency responders. As it is currently written the language could be interpreted to be read as if the stairway is expected to be accessible. Adding "minimum width' would clarify why you need to go to Section 1009.3 – which could require 48" between handrails.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This a terminology clarification.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it is consistent with the terminology for accessible means of egress (Vote: 13-1)

Final Hearing Results

E58-21 AS

E59-21

Original Proposal

IBC: 1011.3, 1011.5.5.1, 1011.5.5.2, 1014.2, 1015.3 (IFC:[BE]1011.3, 1011.5.5.1, 1011.5.5.2, 1014.2, 1015.3)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association (Coderep@stairways.org)

2021 International Building Code

Revise as follows:

1011.3 Headroom. *Stairways* shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting ~~the edge of~~ the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* and landing.

Exceptions:

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than $4^{3}/_{4}$ inches (121 mm).

1011.5.5.1 Nosing projection size. The ~~leading edge (*nosings*) of treads~~nosings shall project not more than $1^{1}/_{4}$ inches (32 mm) beyond the tread below.

1011.5.5.2 Nosing projection uniformity. *Nosing* projections ~~of the leading edges~~ shall be of uniform size, including the projections of the ~~*nosing's* leading edge~~ nosings of the floor or landing at the top of a *flight*.

1014.2 Height. *Handrail* height, measured above ~~*stair* tread~~ the *nosings* of flights of stairs or finish surface of *ramp* slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). *Handrail* height of *alternating tread devices* and ships ladders, measured above ~~tread~~ the *nosings*, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. Where *handrail* fittings or bendings are used to provide continuous transition between flights, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual *dwelling units* in Group R-2 occupancies; where *handrail* fittings or bendings are used to provide continuous transition between flights, transition at *winder* treads, transition from *handrail* to guard, or where used at the start of a *flight*, the *handrail* height at the fittings or bendings shall be permitted to exceed the maximum height.
3. *Handrails* on top of a *guard* where permitted along stepped *aisles* and ramped *aisles* in accordance with Section 1030.16.

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the l~~eading edges of the tread~~ *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the nosings ~~leading edges of the treads~~.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings ~~leading edges of the treads~~.
4. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.
5. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads ~~device tread *nosing*~~.
6. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings ~~leading edges of the treads~~.

Reason: The intent of this proposal is to clarify and correct the references to the leading edge of treads and landings through out sections 1011 Stairways, 1014 Handrails, and 1015 Guards by substitution and/or corrected use of the defined term NOSING. The term Nosing(s) is defined in Chapter 2 of the IBC as:

“**NOSING.** The leading edge of treads of stairs and of landings at the top of stairway flights.”
Understanding the definition, it is clear that the text marked for deletion in each of these code sections is redundant, confusing and unnecessary if the defined term is used properly.

In **1011.3 Headroom** "the edge of the nosing" would read as "the edge of the leading edge" when the definition of nosing is substituted. This is the most simple example. Where similar the substitutions/corrections in other parts of the code have been made, the need to eliminate such redundancy and provide clarification becomes more obvious.

This becomes painfully obvious in **1011.5.5.1 Nosing projection size.** The current text should be interpreted to read *"The leading edge (the leading edge of treads of stairway and of landings at the top of stairway flights) of treads shall project...".* At best it is confusing to those who understand the defined term. Worst case scenario, the current language is misunderstood to not include the nosings at landings.

The addition of “or landing” to 1011.5.5.2 is important to clarify that landings at the top of a flight but not at a just a“floor” level must also comply and be included. Although a floor at the top of a flight provides the required landing, it is possible to have an intermediate landing that is not at a "floor"level.

Similar substitutions/corrections have been made to both the handrail height and guard height sections. In Exception 5 of 1015.3 related to Alternating Tread Devices, the term "a line connecting" has been added to accurately describe where to measure from however the reference to treads is used because alternating tread devices are not considered a flight of stairs and the term nosing has been correctly deleted.

As an editorial note “nosing” should be in italics throughout the published code text to conform with the current formatting practice.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change does not affect a material change that will change the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1014.2 Height. *Handrail* height, measured ~~above~~ from a line connecting the *nosings* of flights of stairs or finish surface of *ramp* slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). *Handrail* height of *alternating tread devices* and ships ladders, measured ~~above~~ from a line connecting the *nosings*, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. Where *handrail* fittings or bendings are used to provide continuous transition between flights, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual *dwelling units* in Group R-2 occupancies; where *handrail* fittings or bendings are used to provide continuous transition between flights, transition at *winder* treads, transition from *handrail* to guard, or where used at the start of a *flight*, the *handrail* height at the fittings or bendings shall be permitted to exceed the maximum height.
3. *Handrails* on top of a *guard* where permitted along stepped *aisles* and ramped *aisles* in accordance with Section 1030.16.

Committee Reason: The modification is a clarification for the handrail height measurement. This would provide a consist line for measurement instead of stepping. The proposal was approved as it cleans up the language by being more specific and technically accurate. This should improve enforcement because this is easier to understand. (Vote: 14-0)

Final Hearing Results

E59-21	AM

E60-21

Original Proposal

IBC: 1011.5.2 (IFC:[BE]1011.5.2)

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Revise as follows:

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads or between the *stairway* landing and the adjacent tread. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be Accessible or Type A dwelling or sleeping units; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^{3}/_{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19.1 mm) but not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

Reason: The 2010 ADA Standards, he Uniform Federal Accessibility Standards, and the Architectural Barriers Act (ABA) Accessibility Standard all require all stairs that are a part of a means of egress in accessible buildings and facilities to comply with provisions for stair geometry that are the same as those in the main paragraph of Section 1011.5.2. There is no exception in these documents for stairs within dwelling units or sleeping units that must be accessible. .

Cost Impact: The code change proposal will increase the cost of construction
This code change will increase costs where Accessible or Type A dwelling or sleeping units are required by the code, but are not also required by Federal laws such as, the Americans with Disabilities Act, the Architectural Barriers Act, or Section 504 of the Rehabilitation Act of 1973, as amended.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because stairways are never part of an accessible route, therefore, there should not be different requirements for stairways within Accessible or Type A units. (Vote: 14-0)

Public Comments

Public Comment

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com) requests As Submitted

Commenter's Reason: The Committee disapproved this proposal because "stairways are never part of an accessible route" and "therefore, there should not be different requirements for stairways within Accessible or Type A units.".

- Federal Rules: The committee correctly recognized that stairs are not part of an accessible route. However, the Federal ADA requirements (see bibliography) regarding what the IBC calls "Accessible" and "Type A" units require all stairs that are part of a means of egress to comply with the 7/11 stair geometry.
- Stairs used for egress: While not all people with mobility disabilities can use stairs, some can, particularly in an emergency. There are many reasons why anyone, particularly a person with a mobility disability might be better off not using the dwelling unit elevator, even if it is working, during an evacuation.
- No opposition: During the hearing, the Stairway Manufacturers agreed with this interpretation and there was no opposition.
- Flats recognized as equivalent: Nothing in the IBC, the ICC A117.1, or the ADA requires Accessible and Type A dwelling units to be multistory units. In fact, the ADA clearly recognizes single-story units to be equivalent to multi-story units provided they have the same living spaces.

Bibliography: 2010 ADA Standards (https://www.access-board.gov/ada/#ada-210). Section 210.1 requires the following: "210.1 Stairways. Interior and exterior stairs that are part of a means of egress shall comply with 504".
2010 ADA Standards Section 504.2 (https://www.access-board.gov/ada/#ada-504). Section 504.2 requires the following: "All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be 4 inches (100 mm) high minimum and 7 inches (180 mm) high maximum. Treads shall be 11 inches (280 mm) deep minimum."

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Because there is no requirement for multistory Accessible or Type A units, any cost impact related to making the stairs accessible can be attributed to a design choice - the choice to design a multi-story unit instead of a flat unit.

Final Hearing Results

E60-21	AS

E62-21

Original Proposal

IBC: 1011.5.4.1 (IFC:[BE]1011.5.4.1)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association (Coderep@stairways.org)

2021 International Building Code

Revise as follows:

1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The *nosings* ~~or leading edges of treads~~ at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair* ~~and shall have a slip-resistant surface~~. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

Reason: The text "leading edges of treads" has been deleted as it is not only redundant and unnecessary it erroneously only referencing the nosings of treads. This code specifically intends to regulate non uniform risers at **landings**. The use of Nosing alone is accurate and sufficient. NOSING is a defined term and also applies to landings. Use of the defined term resolves the erroneous language.
From Chapter 2 Definitions

NOSING. The leading edge of treads of stairs and of landings at the top of stairway flights.

A marking stripe at nonuniform height risers is needed however the reference to slip resistance, as used here is a last bastion of a long ago assumption that a slip resistant surface at the nosings increased safety. In fact, the entire tread surface and all the treads in a flight should be of uniform slip resistance. A rough surface at the nosing causes the foot to drag and can cause a unexpected loss of balance in ascent or descent that can result in a fall. Furthermore enforcement of this subjective term has proven controversial at best. The term "slip resistant" should be eliminated as referenced in this requirement for nonuniform risers that are already enough of an issue to require special marking for identification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
A marking stripe is still required to be applied or incorporated in the walking surface the cost of which is unlikely to change due to this change.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because the committee felt that the marking stripe on the stairway had to have the same slip resistance as the rest of the stairway. The marking stripe can be on the edge of a landing as well as a tread. (Vote: 12-2)

Final Hearing Results

E62-21	AS

E64-21

Original Proposal

IBC: 1011.5.5.1 (IFC:[BE] 1011.5.5.1)

Proponents: Thomas Zuzik Jr, Railingcodes.com, the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Building Code

Revise as follows:

1011.5.5.1 Nosing projection size. The leading edge (*nosings*) of treads shall project not more than $1^{1}/_{4}$ inches (32 mm) ~~beyond~~ <u>over the required depth of</u> the tread below.

> <u>**Exception:** When solid risers are not required, the nosing projection is permitted to exceed the maximum projection limit over the tread below.</u>

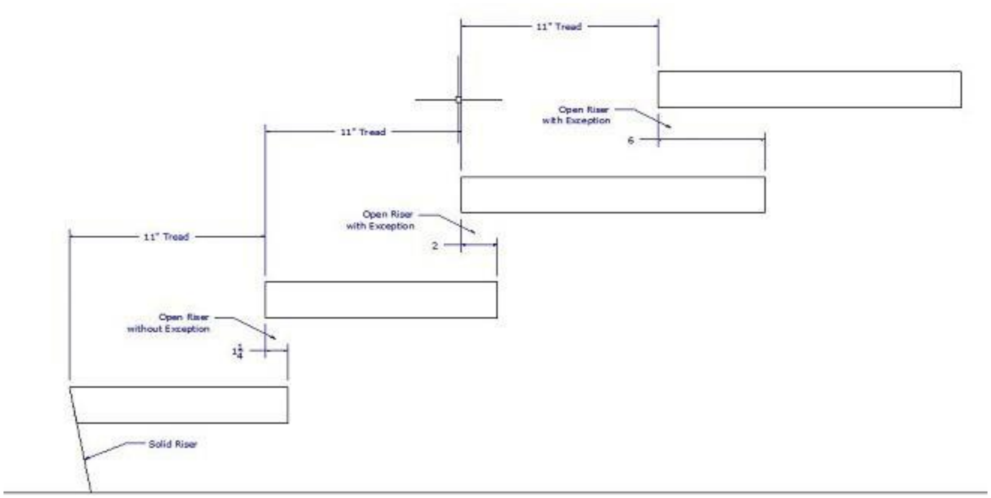
1011.5.5.2 Nosing projection uniformity. *Nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosing's* leading edge of the floor at the top of a *flight*.

1011.5.5.3 Solid risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

Reason: When open risers are allowed per exceptions 1, 2 or 3 of Section 1011.5.5.3 Solid risers; limiting the depth of the nosing projection over the tread below does not limit or prevent how far a foot or other object may project under the tread above. The new exception to Section 1011.5.5.1 removes the maximum limit on the nosing projection allowing for the option of a deeper tread under the tread above when open risers are allowed and present.
The sketch below is provided for reference.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal only allows for the possibility for the treads to be larger, but does not require them to be larger nor allow for the treads to be smaller. Thus, it adds no cost to a project, unless the project designer elects to add cost.

Staff note: Proposals E61-21, E63-21 and E64-21 addresses requirements for nosing in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1011.5.5.1 Nosing projection size. The leading edge (*nosings*) of treads shall project not more than $1^1/_4$ inches (32 mm) beyond ~~over the required depth of~~ the tread below.
Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projectio~~nlimit over the tread below~~.

Committee Reason: The modification removed a conflict with tread depth. The proposal was approved as it clarified that the controlling dimension is the location of the riser. The full tread depth is from nosing to nosing and does not change where the horizontal piece if larger than the tread. (Vote: 8-6)

Final Hearing Results

E64-21 AM

E69-21

Original Proposal

IBC: 1013.2 (IFC:[BE] 1013.2)

Proponents: Carl Baldassarra, Wiss Janney Elstner Associates, Inc, Self (cbaldassarra@wje.com)

2021 International Building Code

Delete without substitution:

~~**1013.2 Low-level exit signs in Group R-1.** Where exit signs are required in Group R-1 occupancies by Section 1013.1, additional low-level exit signs shall be provided in all areas serving guest rooms in Group R-1 occupancies and shall comply with Section 1013.5. The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 18 inches (455 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side.~~

Reason: This proposal deletes a code requirement that provides a negligible fire safety benefit in fully-sprinklered R-1 occupancies. The requirement is no longer necessary in consideration of the substantial changes made in the legacy codes and the IBC to improve the level of safety in R-1 occupancies, as demonstrated by the fire record.
Interest in low-level exit signage for hotels was generated as a result of the MGM Grand Hotel fire in 1980 and other hotel fires in that era. While many people died as a result of that fire, the building is widely recognized as a "case study" of design deficiencies and code violations. The design and construction of that building bears <u>no</u> resemblance to buildings designed in accordance with the current or previous editions of the IBC.

Brief History of Requirement

The requirement for low-level exit signage in R-1 occupancies was proposed a number of times between 1980 and the last edition of the three legacy codes (1999) and was generally disapproved due to the lack of a perceived need. Only one of the three codes adopted such a provision, first adopted in 1994.

The early editions of the IBC did not have a requirement for low-level exit signage. It was first adopted into the 2012 edition of the IBC, the stated reason being that R-1 occupancies have transient occupants who are not familiar with their surroundings and because exit signs installed in the traditional locations would not be visible when occupants are forced to crawl on the floor to reach the exits. This is a false premise.

In fact, the code change proposal was initially rejected by the Code Development Committee on the basis that there was no technical justification. During the public comment period, the proponent stated, "Over the years, thousands have died from smoke inhalation while attempting to flee the burning building." Again, this statement is grossly lacking a technical basis; there is no substantiation whatsoever that buildings designed and constructed in accordance with the IBC have ever performed in such a manner. The proponent addressed a number of other minor issues cited by the Committee, but never addressed the main issue for the initial Disapproval – the lack of a technical justification. Nevertheless, it was adopted.

Current Fire Safety Features in R-1

The fact is that R-1 occupancies designed and constructed in accordance with the fire safety features in the IBC provide a *very high* degree of life safety, as demonstrated by the "systems concept" performance-based analysis per NFPA 550, and as supported by the fire record.

The fire safety features of R-1 occupancies included in the IBC are based upon long-established, fundamental principles of fire safety and, working together, provide a high degree of redundancy should any one feature fail.

The analysis using the principles in NFPA 550 and the fire safety features in R-1 occupancies include:

Managing the fire by controlling the fuel

o Noncombustible construction (as required by building geometry)

o Control of interior finish

o Control of furnishings (varies with fire code)

o Control of decorations

Limiting the fire by construction

o Fire resistance rated construction (as required by building geometry)

o Fire-rated guest rooms (sleeping units)

o Rated corridor construction and opening protectives

o Rated egress paths

o Manage smoke intrusion into guest rooms and the means of egress system (smoke control)

Limiting fire by suppression

o Automatic sprinkler protection

o Quick-response sprinkler technology

o Manual suppression (standpipe systems) for multi-story buildings

o Redundant water supplies in very tall buildings

o Automatic notification to fire department

o Electrical supervision of automatic sprinkler system components

Moving occupants to safety

o Redundant, protected means of egress system for building evacuation

§ Number of exits

§ Exit capacity

§ Exit travel distance

§ Dead-end corridor limitations

§ Exit signage

§ Exit path lighting

§ Early detection and occupant notification within sleeping rooms and suites

§ General building-wide occupant notification by automatic and manual means (as required by building geometry)

§ Manage smoke intrusion into means of egress system (smoke control)

o Alternatively, a defend-in-place strategy for very tall buildings (using fire resistive construction and the other features above)

The above represents the major features required by the 2021 IBC that contribute to the safety of R-1 occupancies. One of the most important and fundamental of these features is the compartmentation of guest rooms, employing rated construction and opening protectives, including self-closing doors to the corridor. That feature alone provides a high-degree of limiting guest room fires to the room of origin. The NFPA reports that 90% of hotel and motel fires are limited to the room of origin ["Structure Fires in Hotels and Motels," Richard Campbell, NFPA; September 2015].

Another significant feature is automatic sprinkler protection. Following the fires that occurred in the late 1970s and early 1980s, the hotel industry responded with an aggressive campaign to include automatic sprinkler systems, and fire detection and alarm systems. Significant improvement in the fire safety record soon followed. Moreover, the development of quick response sprinkler technology significantly improved the level of fire safety for people in the room of origin, with sprinklers that operate early in the fire growth period to reduce the quantities of smoke, carbon monoxide and temperatures, keeping the room of origin tenable for survival. Of course, if the condition of the room is survivable afforded by quick response sprinklers, the tenability of the corridor, even in the event of an open guest room door, will be similar and, likely, much better.

Do low-level exit signs have a benefit? Perhaps, such as when the occupants' path to egress the structure is entirely within the room of origin. As an example, we have seen low-level exit signs required in Special Amusement Buildings by the legacy codes beginning in 1990 and included in the IBC today. That makes sense where the exit path is not clear, occupants are restrained on a conveyance or confused by the sights and sounds of the entertainment and, therefore, people are expected to be in the fire environment for all or a large portion of their egress. We also see another example of such a practical use by the installation of floor lighting and low-level exit signs in aircraft where occupants are within the "room" of origin. Again, that is not the case in R-1 occupancies; the corridor is separated from the room of origin.

This same approach is included in the NFPA Life Safety Code. Low-level exit signs are required in Special Amusement Buildings, not in R-1 occupancies.

The Fire Safety Record

As previously stated, the facts about the high level of fire safety in R-1 occupancies resulting from meeting the current requirements of the IBC are demonstrated by their fire safety record.

NFPA data shows that, for the period 2009 to 2013, U.S. fire departments responded to an estimated average of 3,520 structure fires in hotels and motels each year. These fires resulted in annual losses of 9 civilian deaths, 120 civilian injuries, and $84 million in direct property damage [Campbell]. This represent a substantial reduction in fatalities from previous annual average of 12,000 fires and 100 fatalities in 1980. The leading area of origin of fatal hotel fires was reported to be the bedroom (68%). Nothing in the fire record cites low-level exit signs as a contributing factor to the fatalities and injuries.

NFPA also reported that "sprinklers provide effective fire protection in hotel and motel properties" [Campbell]. According to the most recent NFPA report on the U.S. experience with automatic extinguishing systems at the time of the report, deaths per thousand reported fires were "100% lower when wet pipe sprinklers were present, compared to fires with no automatic extinguishing equipment" [Campbell]. In other words, there were essentially no reported deaths in sprinklered hotels and motels in the study period.

There has been such a dramatic decline in the number of fire fatalities and injuries in hotel and motel occupancies over the last 40 years that NFPA no longer breaks out the loss experience for hotels and motels as a category, instead aggregating the data into "Residential – Other."

It is generally true that providing a high degree of fire safety for building occupants enhances the safety of first responders. In another study, "A Review of the Validity of Estimates of Hotel and Motel Fire Deaths," prepared by Tri-Data Corporation, December, 1994, there were no reported fire fighter fatalities in hotel and motel fires in the study period of 1988 to1992.

Conclusion

An analysis of the fire safety requirements in the IBC demonstrates that a robust and redundant strategy is employed and is responsible for an exemplary fire safety record for R-1 occupancies. The recently added requirement for low-level exit signs in R-1 occupancies does not have a technical basis and reduces important fire safety resources that can be better applied in another manner.

In summary, I am hopeful that we can all agree that, by complying with the requirements of the IBC, we do not expect that occupants will need to crawl out of the building in the event of a fire. Therefore, there is no reason to design the building in that manner.

***

Cost Impact: The code change proposal will decrease the cost of construction
The cost impact will vary based upon the size and configuration of the building.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: Replace the proposal with the following:
1013.2 Low-level exit signs in Group R-1. Where exit signs are required in Group R-1 occupancies by Section 1013.1, additional low-level exit signs shall be provided in all areas serving guest rooms in Group R-1 occupancies and shall comply with Section 1013.5.
The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 18 inches (455 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side.

Exception: Low-level exit signs are not required in Group R-1 occupancies when the building is equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.3.1.1 or 903.3.1.2

Committee Reason: The modification was approved because the exception would be valid for older hotels that were not fully sprinklered, however, the word ‘additional’ was removed from the proposed modification as not necessary. The committee stated that the research for the reason statement was exceptional. As technology has advances the codes should allow for removal of antiquated requirements. (Vote: 13-0)

Final Hearing Results

E69-21 AM

E71-21

Original Proposal

IBC: 1013.5, 1013.5.1 (New) [IFC:[BE]1013.5, 1013.5.1 (New)]

Proponents: Traci Harvey, Spokane County Washington, Washington State Association of Fire Marshals

2021 International Building Code

Revise as follows:

1013.5 Internally illuminated exit signs. Electrically powered, *self-luminous* and *photoluminescent* exit signs shall be *listed* and labeled in accordance with UL 924 and shall be installed in accordance with the manufacturer's instructions and Chapter 27. Exit signs shall be illuminated at all times. <u>Exit signs shall be easily discernable and legible at all times</u>.

Add new text as follows:

<u>**1013.5.1 Photoluminescent exit signs installation.**</u> **.** <u>Photoluminescent exit signs shall be installed in locations where normal operating lighting conditions is sufficient to adequately charge the sign.</u>

Reason: This section addresses a pervasive problem the working group has tried to address in photoluminescent exit signs. Photoluminescence is a process whereby luminescence is induced by the absorption of visible light. The use of photoluminescent exit signage in a low light areas [ie: movie theatres] has presented a problem where minimal or no ambient light is available to recharge the sign. The code lacks adequate means to address photoluminescent exit signs.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal would not directly increase construction costs as it clarifies that exit signs need to be seen to perform the intended function.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved. The additional language to Section 1030.5 is already addressed in exit sign requirements in Section 1030.1. UL924 already addressed requirements for charging photoluminescent exit signs. The suggested language in Section 1030.5.1 is vague – how could a code official determine 'adequate'? The reason statement talks about movie theaters but lights turn on and off in these venues, so the proposed language does not work for those locations. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Traci Harvey, Spokane County Washington, Washington State Association of Fire Marshals (harveyt@spokanevalleyfire.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1013.5.1 Photoluminescent exit signs . Photoluminescent exit signs shall be provided with an illumination source to charge the exit sign in accordance with the manufacturers instructions.

Commenter's Reason: The intent of this PC is clarify the original intent of the proposal that photoluminescent exiting signs are installed only in locations where they receive enough light to be able to function appropriately. This new language replacing the original proposal refers to the manufacturers instructions as that will better define what operating lighting is considered sufficient to charge the sign.
The revision initially submitted to Section 1013.5 was removed as such language is already addressed in Section 1013.1.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is a clarification that is ensuring these signs work appropriately as intended.

Final Hearing Results

E71-21	AMPC1

E73-21

Original Proposal

IBC: 1014.3 (New) [IFC:[BE]1014.3 (New)]

Proponents: Lee Kranz, City of Bellevue, WA, Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Add new text as follows:

1014.3 Lateral location. Handrails located outward from the edge of the walking surface of flights of stairways, ramps, stepped aisles and ramped aisles shall be located within 6 inches (152.4 mm) measured horizontally from the edge of the walking surface. Handrails projecting into the width of the walking surface shall comply with Section 1014.8.

Reason: Surprisingly, the code does not currently regulate the lateral distance that a handrail can be located away from the edge of the walking surface of a stair, ramp or aisle. If an architect wanted to locate a handrail 24 or even 36 inches away from the walking surface, there is currently no code provision to prevent that from happening. Most building officials would not permit that design but there is no code backing to support them. The substantive data provided as part of this code change provides the justification for limiting the lateral distance of the handrail to be not more than 6" from the edge of the walking surface. This code change is needed to insure that handrails will be located close enough to the edge of the walking surface to provide adequate support for pedestrians with limited reach capabilities. Handrails that protrude into the required width of the stairway, ramp or aisle are currently regulated in Section 1014.8
See the reason statement for E72-21 for additional anthropometric data.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not increase the cost of construction. The intent is to improve the safety for those needing to use a handrail while traversing on stairways, ramps and aisles.

Staff Note: E72-21, E73-21 and E79-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee disapproved this proposal based on their action on E72 and for the same reasons. (Vote 7-6)

Public Comments

Public Comment 2

Proponents: Richard Williams, CWA Consultants, Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Submitted

Commenter's Reason: Many building officials are surprised when they learn that the building code does not limit how far away a handrail can be from the edge of a stair or ramp walking surface. E73 would limit how far a handrail can be located away from the edge of the walking surface of a stairway tread or a ramp. The anthropometric data submitted with E72-21 (E72 and E73 were submitted together) shows that a handrail located within 6” of the edge of the walking surface of a stair or ramp is reasonable and is a vast improvement over what we have now.

The Means of Egress Committee raised the following issues. Our response to them follows each point.

1. **Issue:** The proposal would create the option to have a 6" opening between the edge of the walking surface and the guard.

Response: You are still required to comply with the guard requirements in Section 1015.4, which only allows a 4” space. See Figure 1 below.

2. **Issue:** Related to #1 above, someone could place their foot in the gap between the edge of the walking surface and the guard.

Response: While current edge protection requirements for ramps would prohibit this, the current code does not prohibit creation of a 4” gap between the edge of the walking surface and the guard for stairs. This proposal does not change anything regarding how much space is allowed at the edge of a stair tread or ramp in relation to the bottom of a guard. Again, see Figure 1 below.

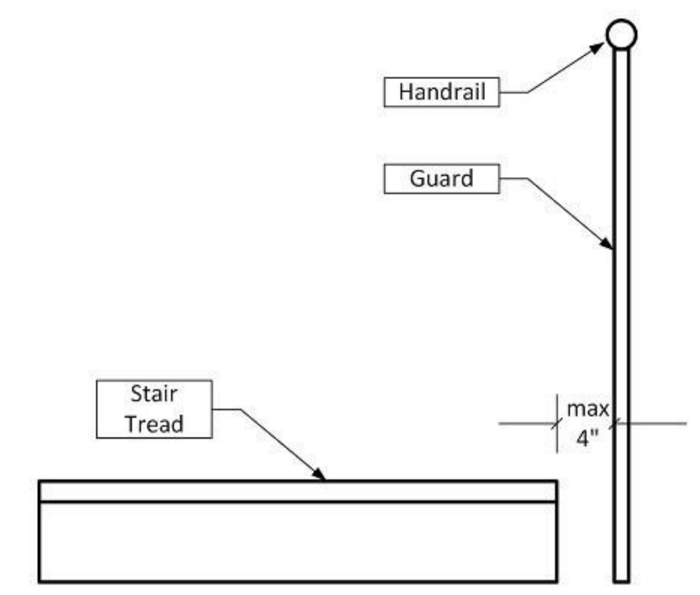


Figure 1 - Gap at Guards

(Not Prohibited in IBC 1015.4; Not Changed by E72/E73)

3. **Issue:** The anthropometric data did not include individuals with physical disabilities or sight impairments.

Response: The data was collected from the Stair Builders and Manufacturer’s Association (SMA) and includes data on how an older person, a young child, a woman carrying a baby and a healthy person would use a handrail. There are also links to videos showing persons with difficulty walking and how they rely on the use of the handrail for stabilization and support. After studying the data, limiting the handrail to be within 6” of the edge of the walking surface of a stair or ramp was determined to be the most reasonable distance for the handrail location.

Photographic Examples. Photos 1, 2 and 3 below show the difficulty using a handrail that is 15 ½” away from the edge of the walking surface. In all the photos, the person’s arm is already fully- or over-extended, which is not comfortable for the user, nor is it safe if the person were to trip. You can see that this is an extreme example of what the code currently allows (i.e. not regulated). It’s not a safe design but without language in the code that limits the handrail reach range, it’s legal for the design professional to design it this way.

Photo 4 shows how the same child in Photo 3 can easily reach a handrail located 6" from the edge of the walking surface (note the bent elbow). The wood handrail in this photo is at approximately the same height as the handrail that is in the background, which is 15-1/2 inches from the edge of the stair. This shows 6” is a reasonable and safer limitation for the handrail placement, even for a small child.

Photo 1: 15-1/2" Lateral Distance; 5'-10" Person

Photo 2: 15-1/2" Lateral Distance; 5'-1" Person

Photo 3: 15-1/2" Lateral Distance; 3'-1" Child

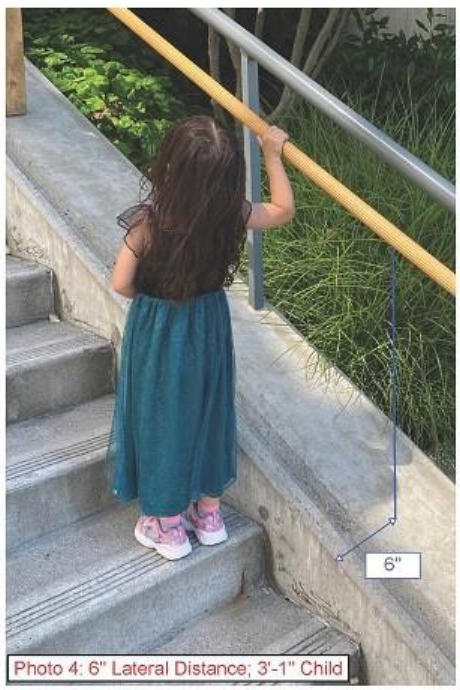


Photo 4: 6" Lateral Distance; 3'-1" Child

During testimony at the CAH, a question was raised as to the applicability of the figure in the reason statement showing the escalator. Our response is that this was included only to demonstrate the viability of the 6" lateral distance, since escalators are allowed to have up to 9-1/2" from the edge of the tread to the handrail.

E72 also proposes a 6" lateral distance. The only difference between E72 and E73 is how they are formatted in the code; there are no substantive differences. We would note that one of the people who spoke in opposition to this proposal at the CAH submitted a public comment to an ultimately unsuccessful proposal last cycle on the same topic (E76-18), in an attempt to set the lateral distance to zero (no offset allowed). This public comment did not get onto the ballot for the online vote. It is also worth noting that the egress committee final vote on E73 (and E72) was very close.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This code change simply limits the distance that a handrail can be located away from the edge of the walking surface of a stair or ramp. There will be no impact to the cost of construction.

Final Hearing Results

E73-21	AS

E74-21

Original Proposal

IBC: 1014.4; (IFC:[BE] 1014.4)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association (Coderep@stairways.org)

2021 International Building Code

Revise as follows:

1014.4 Continuity. *Handrail* gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

Exceptions:

1. ~~*Handrails* within~~Within a *dwelling unit* ~~*units*,~~ ~~are permitted~~ the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1^1/_2$ inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions. For each $^1/_2$ inch (12.7 mm) of additional *handrail* perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1^1/_2$ inches (38 mm) shall be permitted to be reduced by $^1/_8$ inch (3.2 mm).
4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the *handrail* gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.
5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

Reason: This change clarifies the intent of the exception is not to allow the use of newel posts at a turn or landing, but to allow the interruption of handrail continuity by a newel post at a turn or landing. The use of newels is not prohibited in the code and does not require an exception. This correlates with a similar approved change to the IRC due to conflicting interpretations offered by staff in Birmingham and Chicago. In addition we have changed the reference to "dwelling units" to "a dwelling unit" to match the language in exception 2.

Cost Impact: The code change proposal will decrease the cost of construction
Current interpretations vary across the country making frequency impossible to predict. Newels vary greatly in design, cost and material, making this impossible to fairly calculate. However the difference will likely be no less than several hundred dollars when continuous rails are required at a turn or landing compared to the additional cost of a typical post to post system without fittings and less installation labor. If the entire stair system is to match, the price could conservatively escalate to more than a thousand dollars for the most simple commodity stairs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1014.4 Continuity. *Handrail* gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.
Exceptions:

1. Within a *dwelling unit* , that is not an Accessible unit or Type A unit, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.

2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.

3. Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1^1/_2$ inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions. For each $^1/_2$ inch (12.7 mm) of additional *handrail* perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1^1/_2$ inches (38 mm) shall be permitted to be reduced by $^1/_8$ inch (3.2 mm).

4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the *handrail* gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.

5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

Committee Reason: The modification coordinates this proposal with the federal accessibility requirements in the ADA, ABA and Section 504. This is needed in units geared more towards persons with mobility impairments. The committee also suggested a public comment to add the same modification to Exception 2. The proposal was approve as it clarifies the exception for handrail continuity. (Vote: 10-4)

Final Hearing Results

E74-21	AM

E76-21

Original Proposal

IBC: 1014.6 (IFC:[BE]1014.6)

Proponents: Thomas Zuzik Jr, Railingcodes.com, the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Building Code

Revise as follows:

1014.6 Handrail extensions. *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight of stairs* or *ramp* run. Where *handrails* are not continuous between flights, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the flights of *stairs* at *stairways* and the *ramp* runs at *ramps* <u>and shall extend the required minimum length before any change in direction</u>. <u>The length of the extension shall be measured in accordance with Section 1014.4 or 1014.7, whichever is less.</u>

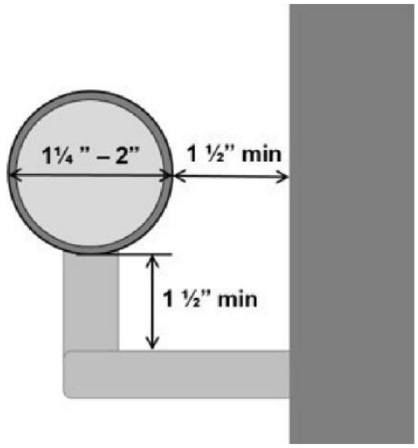
Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the *handrail* extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between flights or to extend beyond the top or bottom risers.

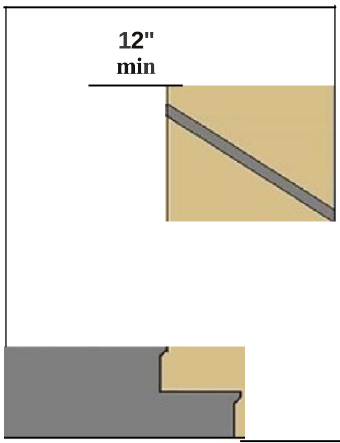
Reason: One of the most common handrail conflicts fabricators undergo with design professionals, contractors and inspectors is the proper termination of handrail extensions. Architectural drawings and plans continue to be widely drawn and distributed with incorrect minimum termination lengths and premature changes in direction. The family of ICC codes, A117.1, ADA and ABA covertly state where to measure the minimum extension length to and understate that handrail extensions “shall be in the same direction” before any change in direction; this leads to the codes and standards largely being misinterpreted by designers, contractors, fabricators, and inspectors that the minimum extension length is required to be met before any change in direction over landings is permitted. The diagram figures of A117.1, 2010 ADA, ABA and posted information on the US Access Boards website clearly explain that handrail extensions are to be measured to the furthest usable portion of the handrail before a return or termination, and specifically not to use a handrails overall length.

This code change specifically addresses both the issues outlined above by clearly defining the parameters a handrail termination is to be measured to, and the minimum length a handrail extension shall meet before any change in direction is allowed. The diagram figures shown below provide visual reference of the intended points to measure extensions to in A117.1, 2010 ADA & ABA, the figures however are not part of the IBC. Thus this code change provides a written description within the IBC that designers, contractors, manufactures and inspectors can clearly follow that will produce a result that meets the intent of the code for the extensions to be fully usable for the entire minimum length before any change in direction or termination occurs.

Specifications for handrails also *address the diameter of circular* cross sections *and required knuckle clearance.*

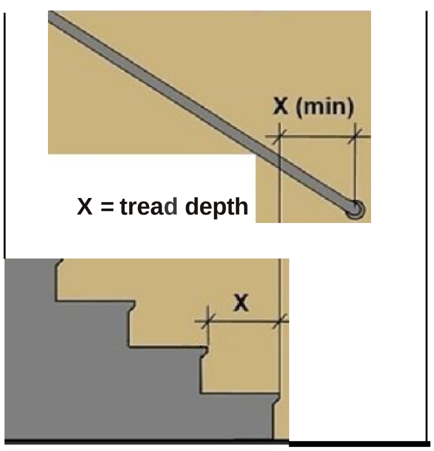


Top Handrail Extension

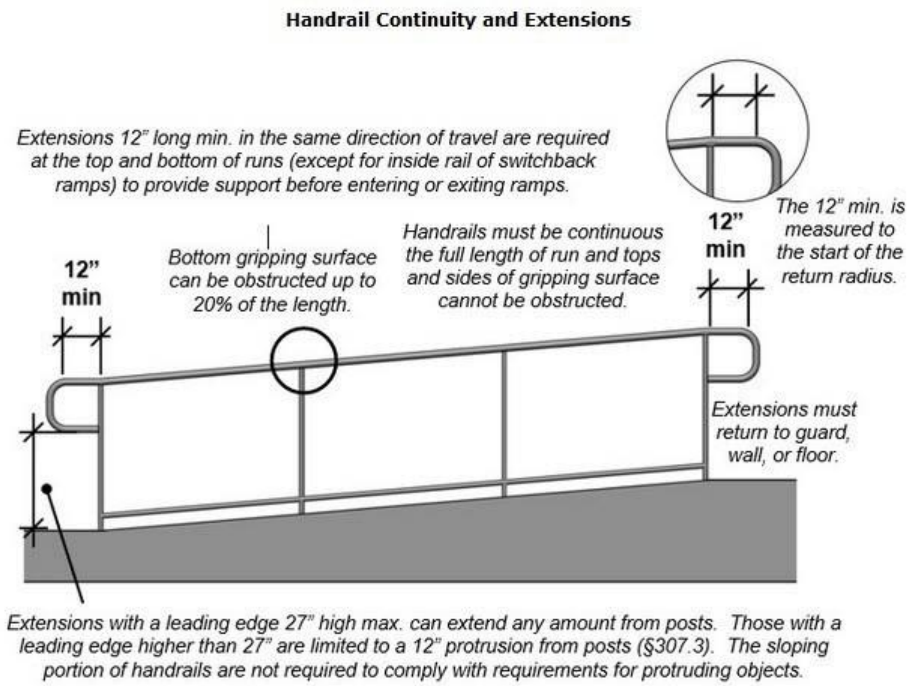


Handrails at the top of stairways must *extend 12" minimum horizontally above the landing beginning directly above the first riser nosing* or *be continuous to the handrail of an adjacent stair flight (§505.10.2).*

Bottom Handrail Extension



Handrails at the bottom must extend beyond the last riser *nosing at the slope of the stair flight for a distance at least equal to* one *tread depth or be continuous to the handrail of an adjacent stair flight protruding objects.*



Surface requirements and clearances facilitate a power grip along the length of handrails. Handrails can have circular or non-circular cross-sections, but must have rounded edges. The gripping surface and adjacent surfaces must be free of abrasive or sharp elements.

Bibliography: The figures shown were downloaded from the U.S. Access Board - Home (access-board.gov)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is providing clarification of already required parameters within the code.

Staff Note: E75-21 and E76-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because the committee felt the handrail extension should be measured from the stairway nosing. The proposed text matches the interpretation issued by the U.S. Access Board. (Vote: 12-2)

Public Comments

Public Comment 1

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1014.6 Handrail extensions . *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight of stairs* or *ramp* run. Where *handrails* are not continuous between flights, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top ~~riser~~landing nosing and continue to slope for the depth of one tread beyond the bottom ~~riser~~tread nosing. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the flights of *stairs* at *stairways* and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.4 or 1014.7. ~~The length of the extension shall be measured in accordance with Section 1014.4 or 1014.7, whichever is less.~~

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the *handrail* extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between flights or to extend beyond the top or bottom risers.

Commenter's Reason: The substitution of "Nosing" for "Riser" provides a place to measure from that will ensure consistent measurement when stairs have sloped risers or none at all. This modification complies with the interpretive illustrations of handrail extension standards provided in the proposal from the access board and will ensure consistent enforcement. In the committees discussion of both E75 and E76 this modification was a portion of E75 that was highly recommended by the committee to be added to E76 by public comment.
The last sentence has been deleted to be more clear. It has been replaced with "or decrease in the clearance as required by Section 1014.4 or 1014.7". Section 1014.4 Continuity cites clearance at handrail brackets and Section 1014.7 cites clearance at walls and other surfaces. Clearance is relevant as the clearance decreases at the beginning of the bend of the return, the change of direction, and identifies the end of the required length of the extension and that it has the required clearance for the full length.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This modified proposal merely clarifies the current requirement.

Final Hearing Results

E76-21	AMPC1

E77-21

Original Proposal

IBC: 1014.7 (IFC:[BE]1014.7)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association (Coderep@stairways.org)

2021 International Building Code

Revise as follows:

1014.7 Clearance. Clear space between a *handrail* and a wall or other surface shall be not less than $1^1/_2$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

<u>**Exceptions**</u>:

1. <u>A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed</u>.
2. <u>Mounting flanges, no more than 1/2" (12.7 mm) thick at the returned ends of handrails shall be allowed</u>.

Reason: Exception 1 is necessary because the code requires the return of handrails that effectively narrow the required clearance. To avoid a decrease in the clearance would require a right-angle return that exposes an objectionably sharper outside corner.
Exception 2 provides for commonly used mounting flanges used to connect the returned end to the wall. Using a flange mount can provide for compliant structural attachment and eliminate the need to use a bracket at the end. Unlike brackets that obstruct the bottom grasping surface of Type I handrails at a critical point where entry and exit from the stairway require a change of gait and postural stabilization the use of a flange mount improves safe use and access.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will not affect design, labor or material costs to comply.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because the proposed text codifies reasonable and common use safety practices at handrails. The committee agreed with the reasoning in the proponents reason that this will provide safe handrails. (Vote: 11-2)

Final Hearing Results

E77-21	AS

E82-21

Original Proposal

IBC: 1015.3 (IFC:[BE] 1015.3)

Proponents: Thomas Zuzik Jr, Railingcodes.com, the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Building Code

Revise as follows:

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-2 and R-3, within the interior space in individual dwelling units, where the open-sided walking surface or landing are located not more than 25 feet (7.62 meters) measured vertically to the floor or grade below, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface or landing.

~~2.~~3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.

~~3.~~4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

~~4.~~5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~5.~~6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

~~6.~~7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: Both the IBC & IRC have accepted the reduction in guard height from 42 inches to 36 inches for private dwelling units since the first model ICC code publications. The current height exceptions within the ICC's family of model codes are focused on a predetermined building height of 3 stories and centered around that the occupants are extremely familiar with their living environment. This code change proposal builds on the established history of the 36-inch height exception currently within the 2021 IBC under exception (1), in Section 1015.3 Height and published in prior model code years also.
This proposal specifically limits the new exception to openside walking surfaces and landings within the interior space of individual dwelling units, within occupancy Groups R-3 & R-2.

The proposal is centered on allowing an owner of a 2 or 3 floor unit within a Group R-2 building who's unit is located on upper floor levels within a building more than 3 stories in height or owns a single-family R-3 dwelling more than 3 stories, by allowing the same guard height exception as a home 3 stories or less; but specifically limits the exception to only the interior area of the dwelling, and only when the interior openside fall in question is less than 25 feet in total rise.

There are many dwelling units that have an interior single floor level rise to a second level located along a stair flight, were the stair flight guard is allowed to be reduced in height from 42-inches to 34-38 inches for the handrail height, however once reaching a mid-landing or the 2nd level are now required to increase the height changing the design of the pattern or ornamental look of the guard. Wanting to keep a consistent height for both the stairs and the landings is highly important when designers are working with ornamental infill in guards.

This new exception is different than exception 1 though similar in wording, however, both exceptions are required to hold the line with the widely established exception allowing the 36-inch guard height for very specific dwelling unit. The history of why previous model code proposals have not had this specific exception is of the concern for making sure that the exception is not used for public areas and private dwelling fall heights above 3 stories. By limiting the exception specifically to interior conditioned space of an individual dwelling and attaching a maximum fall height limit to 25 feet, keeps the exception well within the parameters of the existing exception 1. As to the 25-foot vertical rise limit, this is based on the approximate maximum rise a dwelling unit might have when 2 stair flights are stacked above each other without any mid-landings in either of the stair flights. The horizontal measuring parameters for the 36-inch is based on long established code language for required guards under Section 1015.1.

Cost Impact: The code change proposal will decrease the cost of construction
Having to select a cost impact when submitting a proposal, there will be a savings on projects, but this savings will be very minimal for the most common project if any. The major savings will be seen on much higher cost projects with highly ornamental and detailed guards.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved for consistency with the committee action on E81. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Thomas Zuzik Jr, Railingcodes.com, the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.3 Height . Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.

2. For occupancies in Group R-2 and R-3, within the interior conditioned space ~~in~~ of individual dwelling units, where the open-sided walking surface is ~~or landing are~~ located not more than 25 feet (7.62 meters) measured vertically to the floor or ~~grade~~ walking surface below, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface ~~or landing~~.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.
6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.
7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: Reason:

- Both the IBC & IRC have accepted the reduction in guard height from 42 inches to 36 inches for private dwelling units since the first model ICC code publications. The current height exceptions within the ICC's family of model codes are focused on a predetermined building height of 3 stories and centered around that the occupants are extremely familiar with their living environment. The original code change proposal builds on the established history of the 36-inch height exception currently within the 2021 IBC under exception (1), in Section 1015.3 Height and published in prior model code years also.
- This proposal specifically limits the new exception to openside walking surfaces and landings within the **interior conditioned space** of individual dwelling units, within occupancy Groups R-3 & R-2.
- The proposal is centered on allowing an owner of a 2 or 3 floor unit within a Group R-2 building who's unit is located on upper floor levels within a building more than 3 stories in height or owns a single-family R-3 dwelling more than 3 stories, by allowing the same guard height exception as a home 3 stories or less; but specifically limits the exception to only the interior area of the dwelling, and only when the fall for the interior open side in question is less than 25 feet in total rise.
- There are many dwelling units that have an interior single floor level rise to a second level located along a stair flight, were the stair flight guard is allowed to be reduced in height from 42-inches to 34-38 inches for the handrail height, however once reaching a mid-landing or the 2nd level are now required to increase the height changing the design of the pattern or ornamental look of the guard. Wanting to keep a consistent height for both the stairs and the landings is highly important when designers are working with ornamental infill in guards.
- This new exception is **completely different** than exception 1, though similar in wording in that both exceptions hold the line with the widely established precedent of allowing the 36-inch guard height for very specific dwelling units. However, exception 1 allows both exterior and interior locations. By limiting the exception specifically to the interior conditioned space of an individual dwelling unit and attaching a maximum fall height limit to 25 feet, stays within the parameters of the existing exceptions for lower buildings.
    - As to the 25-foot vertical rise limit, this is based on the approximate maximum rise a dwelling unit might have when 2 stair flights are stacked above each other without any mid-landings in either of the stair flights.
    - Exception 1, conditions the exception to the height of the building structure above grade plane, where as the new exception (2) does not look at how tall the building is above grade plane, the exception only focuses on the height above the walking surface below, within the individual dwelling unit, not outside.
- A review of the video from the committee action hearing's, https://cpdaccess.com/videos/4378/ shows that the committee felt the wording needed to be slightly adjusted and with that adjustment should pass during the final action hearings through public comment.

We ask that you approve this code change proposal as presented with public comment

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The cost impact for this proposal will show a savings on projects, but this savings will be very minimal for the most common project if any. The major savings will be seen on much higher cost projects with highly ornamental and detailed guards

Final Hearing Results

E82-21	AMPC1

E83-21

Original Proposal

IBC: 1015.8, 1015.8.1 (IFC:[BE]1015.8, 1015.8.1)

Proponents: Jeff Inks, Window & Door Manufacturers Association, Window & Door Manufacturers Association (jinks@wdma.com); Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2021 International Building Code

Revise as follows:

1015.8 Window openings. Windows in Group R-2 and R-3 buildings including *dwelling units*, where the bottom of the clear opening of an operable window is located less than 36 inches (914 mm) above the finished floor and more than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, shall comply with ~~one of~~ the following:

1. Where the bottom of the clear opening of the window is located more than 72 inches (1829 mm) and less than 75 feet (22 860 mm) above the finished grade or other surface below on the exterior of the building, the window shall comply with one of the following: ~~Operable windows where the top of the sill of the opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below and that are provided with window fall prevention devices that comply with ASTM F2006.~~
   - 1.1.~~2.~~ Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position, provided the opening is not required for emergency escape or rescue.
   - 1.2.~~3.~~ Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F2090.
   - 1.3.~~4.~~ Operable windows where the openings ~~that~~ are provided with window opening control devices that comply with ~~Section 1015.8.1~~ ASTM F2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section1031.3.1 for emergency escape rescue openings.
2. Where the bottom of the clear opening of the window is located 75 feet (22 860 mm) or more above from the finished grade or other surface below on the exterior of the building, the window shall comply with one of the following:
   - 2.1. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F2090.
   - 2.2. Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position.
   - 2.3. Window fall prevention devices that comply with ASTM F2006.

Delete without substitution:

~~**1015.8.1 Window opening control devices.** Window opening control devices shall comply with F2090–17. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1031.3.1.~~

Reason: This proposal clarifies the window opening protection requirements of this section as they apply based on the height above grade of an operable window. It also modifies the specific location of where height is to be measured – “at the bottom of the clear opening” instead of “top of the sill of the opening” – to be consistent with all other I-code definitions and requirements applicable to operable windows where the height of them is a factor.
The intent of the section is to clearly separate window opening protection requirements/options for operable windows where the lowest portion of the window opening is located more than 72 inches (1829 mm) and below 75 feet (22 860 mm) above the finished grade versus

those located 75 feet (22 860 mm) or above from the finished grade.

As written, while the charging language states “shall comply with one of the following options”, there has been misinterpretation that the first option (where window fall prevention devices complying with ASTM F2006 are allowed where the lowest portion of the window opening is located 75 feet or above) applies to other options such as Option 2 where the opening of the window restricts the passage of a 4 inch diameter sphere. This proposal clarifies that the ASTM F2006 option is independent of any other option and does not apply to the option where the opening of the window restricts the passage of a 4 inch diameter sphere.

Further, we believe it is also important to expressly state that the option to limit the window opening to 4” is not permissible for required emergency escape and rescue openings.

Finally, it also makes editorial sense to move the provisions In 1015.8.1 to Item 3 for window openings located above 72 inches and below 75 feet above grade as those provisions are only applicable to window opening control devices on window openings in those locations and there is no need for a separate section for them.

After considering several options for providing better clarity with respect to the requirements of this section, we believe that separating the requirements as they apply based on height is the most effective way for doing so.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As there are no substantive changes to the technical requirements or application of them, there is no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this is a good cleanup for window opening control devices. (Vote: 14-0)

Final Hearing Results

E83-21 AS

E85-21

Original Proposal

IBC: 1016.2 (IFC:[BE]1016.2)

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Building Code

Revise as follows:

1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Where access to two or more exits or exit access doorways is required in Section 1006.2.1, access to not less than one of the required *exits* shall be provided without travel through the enclosed elevator lobbies required by Section 3006. Where the path of *exit access* travel passes through an enclosed elevator lobby, the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an *exit* is required by other sections of this code.

2. In other than Group H occupancies,egress from a room or space is allowed to pass through adjoining or intervening rooms or areas provided that such adjoining rooms or areas and the area served are accessory to one or the other and provide a discernible path of egress travel to an exit. ~~Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an exit.~~

   ~~**Exception:** *Means of egress* are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy where the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.~~

3. In Group H occupancies, egress from a room or space is allowed to pass through adjoining or intervening rooms or areas provided that such adjoining rooms or areas are the same or lesser hazard occupancy group and provide a discernible path of egress travel to an exit.

~~3.~~4. An *exit access* shall not pass through a room that can be locked to prevent egress.

~~4.~~5. *Means of egress* from *dwelling units* or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.

~~5.~~6. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

Exceptions:

1. *Means of egress* are not prohibited through a kitchen area serving adjoining rooms constituting part of the same *dwelling unit* or *sleeping unit*.
2. *Means of egress* are not prohibited through stockrooms in Group M occupancies where all of the following are met:
   - 2.1. The stock is of the same hazard classification as that found in the main retail area.
   - 2.2. Not more than 50 percent of the*exit access* is through the stockroom.
   - 2.3. The stockroom is not subject to locking from the egress side.
   - 2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) *aisle* defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstructions.

Reason: The proposed code change eliminates an exception to an exception. By specifically calling out what is permitted in an H occupancy, there is no confusion as to how to apply the previous exception which included F and S occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is editorial in nature only and should not impact construction cost. If anything it may decrease it if the exception only applies to H occupancies, which is the intention.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as a good cleanup - it removes and exception from an exception. (Vote: 14-0)

Final Hearing Results

E85-21	AS

E86-21

Original Proposal

IBC: TABLE 1017.2, 1017.2.3 (New) [IFC:[BE] TABLE 1017.2, 1017.2.3 (New)]

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200[e]	250[b]
I-1	Not Permitted	250[b]
B	200	300[c]
F-2, S-2, U	300	400[c]
H-1	Not Permitted	75[d]
H-2	Not Permitted	100[d]
H-3	Not Permitted	150[d]
H-4	Not Permitted	175[d]
H-5	Not Permitted	200[c]
I-2, I-3	Not Permitted	200[c]
I-4	150	200[c]

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:

- Section 402.8 : For the distance limitation in malls
- Section 407.4: For the distance limitation in Group I-2.
- Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
- Section 411.2: For the distance limitation in special amusement areas.
- Section 412.6: For the distance limitations in aircraft manufacturing facilities.
- Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
- Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
- Section 1006.3.4: For buildings with one exit.
- Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
- Section 1017.2.3: For increased distance limitation in Group H-5
- Section 1030.7: For increased limitation in assembly seating.
- Section 3103.4: For temporary structures.
- Section 3104.9: For pedestrian walkways.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

1017.2.1 Exterior egress balcony increase. *Exit access* travel distances specified in Table 1017.2 shall be increased up to an additional 100 feet (30 480 mm) provided that the last portion of the *exit access* leading to the exit occurs on an exterior egress balcony constructed in accordance with Section 1021. The length of such balcony shall be not less than the amount of the increase taken.

1017.2.2 Groups F-1 and S-1 increase. The maximum *exit access* travel distance shall be 400 feet (122 m) in Group F-1 or S-1 occupancies where all of the following conditions are met:

1. The portion of the building classified as Group F-1 or S-1 is limited to one *story* in height.
2. The minimum height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet (7315 mm).
3. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Add new text as follows:

1017.2.3 Group H-5 Increase. The maximum *exit access* travel distance shall be 300 feet (91 m) in the fabrication areas of Group H-5 occupancies where all of the following conditions are met:

1. The width of the fabrication area is 300 feet (91 m) or greater.
2. The area of the fabrication area is 220,000 sq. ft. (18,600 m^2) or greater.
3. The height of the fabrication area, measured between the raised metal floor and the clean filter ceiling, is 16 feet (48768 mm) or greater.
4. The supply ventilation rate is 20 cfm/sq. ft. or greater and shall remain operational.

Reason: The Semiconductor Industry Association commissioned a study by Jensen Hughes to evaluate the feasibility of increasing the exit access travel distance in the fabrication areas of a Group H-5 occupancy. A decision was made to see determine if the travel distance could be increased to 300 feet, as permitted for Group B occupancies. When the Group H-5 requirements were introduced into the Legacy Codes, it was stated that the control requirements would be such that the fire risk associated with a Group H-5 occupancy would be similar to that associated with a Group B occupancy. This concept is reflected in the building area limits in Table 506.2 for other than the recently introduced Type IV building area limits.
The Pathfinder people movement model was utilized to calculate required safe egress times (RSET) and the Fire Dynamics Simulator (FDS) was utilized to evaluate tenability conditions that would result from the design fire.

Bounding facility design parameters were selected based on input from the semiconductor industry to develop minimum requirements for a generic fabrication facility (Fab). These parameters were used as inputs for the computer modeling that was performed and include:

+ Minimum fab width of 300 ft.
+ Minimum fab area of 220,000 SF
+ Minimum distance between raised metal floor (RMF) and clean filter ceiling (CFC) system of 16 ft
+ Minimum (supply) ventilation rate of 20 cfm/SF (at least 25% fan filter unit (FFU) coverage). (must remain running at full capacity during egress)

Performance Criteria

Performance objectives were selected for the generic study to ensure that occupants would not encounter untenable conditions during the period of egress. Visibility, thermal exposure, and smoke toxicity are the commonly used tenability parameters for egress studies. Table 1 summarizes the threshold criteria that were used in the study.

Table 1 – Summary of Performance Criteria for Egress Study

Table 1 – Summary of Performance Criteria for Egress Study

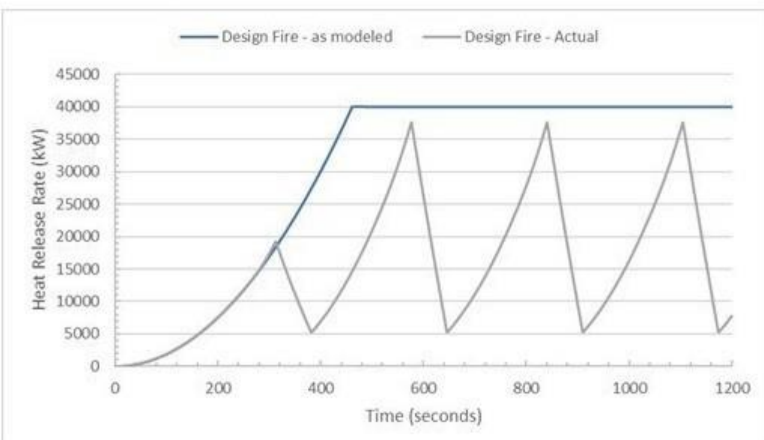
Parameter	Performance Criteria[1]
Visibility distance	At least 33 ft (10 m) to backlit object while en route to exit; At least 10 ft (3.3 m) to backlit object while in queue
Temperature	Less than 76 °C (169 °F)[2]
Toxic Gas (measured as Carbon Monoxide concentration)	Less than 600 ppm[3]

[1] All values measured at 6 ft (1.8 m) above floor
[2] Based on 20 minute exposure before incapacitation [ref]
[3] Concentration levels of approximately 600 ppm can affect cardiac function for some individuals [ref]

Design Fire Scenario

The design fire scenario was based on a flammable liquid spill that ignites and spreads to a process tool. The resulting heat release rate profile was developed based on a generic tool size, the spacing between tools, and a fuel load limit of 1 lb/ft^2 of non-FM 4910 plastic. This information was used to model the fire development for a worst-case tool, and the ability for fire to spread to adjacent tools either in the same row or across the bay or chase.

A maximum heat release rate of 20 MW was calculated for each tool with potential spread to 2 adjacent tools in the time period of evacuation. At any given time, no more than 2 tools would be burning at this steady-state heat release rate of 20 MW each, for a total of 40 MW. Rather than crediting the decay and growth periods that would occur during the time period of tool fire spread, an ultra-fast growing fire that reaches a steady-state value of 40 MW was used to provide a conservative bound for the tool fire scenario (see Figure 1)



Three fire locations (center, southwest corner and west wall locations) were evaluated to examine the effect of location on smoke spread dynamics and the RSET values resulting when a reduced number of exits are available.

Figure 1 – Heat release rate profile for tool design fire scenario

Summary of Egress Times

RSET values were determined by summing the detection, warning, premovement and travel times required to travel to an exit stair and enter the vestibule. The detection time was identified using FDS model data for smoke detection and sprinkler activation, while allowing for the 90 second delay specified in NFPA 72. The warning time was based on IBC requirements for smoke control systems and the premovement time was conservatively selected based on literature data. Travel times were determined by Pathfinder assuming that 96.6% of building occupants travel unimpeded and 3.4% of building occupants require the use of crutches or a cane. These times are summarized in Table 2.

A safety factor of 1.5 was applied to the evacuation times as specified in IBC Section 909.4.6. As shown in Table 2, RSET values ranged between 10.9 and 15 minutes, with longer values corresponding to the southwest corner and west wall fire scenarios where an exit is closed for at least part of the egress time period. The largest RSET value resulted for the west wall fire location where all of the exits are initially available for use. At 380 seconds, the exit is blocked due to diminished visibility conditions, requiring that occupants in the queue travel to another exit.

Table 2 – Summary of Required Safe Egress Time Model Results

Table 2 – Summary of Required Safe Egress Time Model Results

Event	Center Fire No Exits Closed (seconds / minutes)	Southwest Corner Fire One Exit Closed (seconds / minutes)	West Wall Fire One Exit Closed at 380 seconds (seconds / minutes)
Detection	215 / 3.6	215 / 3.6	215 / 3.6
Warning	10 / 0.2	10 / 0.2	10 / 0.2
Pre-movement delay	30 / 0.5	30 / 0.5	30 / 0.5
Travel time	256 / 4.3	385 / 6.4	250 / 4.2
Evacuation time	**511 / 8.5**	**640 / 10.7**	**678 / 11.3**
RSET	**655 / 10.9**	**847 / 14.1**	**904 / 15.0**

Summary of Fire Modeling

FDS models were constructed for the three fire locations, incorporating sprinkler activation to examine mixing effects but not suppression effects. Model results showed that visibility is the limiting tenability parameter where smoke spreads radially from the fire location but never fills the entire Fab. Rather, a steady-state condition is reached for each scenario where the smoke generation rate is balanced with the ventilation rate. For each fire location, the visibility at 6 ft above the floor will exceed 98 ft in approximately 30-50% of the Fab when the steady-state condition is reached.

A sensitivity study was performed to determine if the model results are dependent on FFU coverage, ventilation rate/SF, FFU capacity, FFU dimensions, tool size, and tool height. With the exception of FFU coverage, it was determined that these parameters do not have a significant impact on the spread of smoke, heat and toxic gases in the Fab. Percentages greater than 25% of the FFUs will result in a smaller region of smoke spread.

Conclusions

Based on these results, Jensen Hughes finds that an egress distance of 300 ft. in a generic H5 fabrication design will meet the intent of the IBC where safe egress conditions exist, provided that the minimum design parameters for building width, square footage, ceiling height, and ventilation rate are met.. Therefore, the increased travel distance of 300 ft. (91.5 m) is acceptable and will not impact the safety of occupants in the event that emergency evacuation during a fire is necessary.

Bibliography: H5 Timed Egress Analysis, Performance-Based Design Study for Increasing the Maximum Exiting Distance for a Generic Semiconductor Fabrication Facility, Jensen Hughes, 2021.

Cost Impact: The code change proposal will decrease the cost of construction
Increasing the maximum exit access travel distance permits more efficient use of the area of the building.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that they did not have the expertise to make the decision on hazards associated with H-5. This should have a third party review. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com) requests As Submitted

Commenter's Reason: The Committee voted for Disapproval of E86-21 because they "felt that they did not have the expertise to make the decision on hazards associated with H-5. This should have a third party review."
Based upon the Committee reason for Disapproval, SIA retained Arup to review the report prepared by Jensen Hughes. One of the specific questions raised by the Committee was whether the modeling that was document in the Jensen Hughes report were the appropriate analytical tools to be used. In response to that question, Arup commented "that the simulation tools used to estimate RSET vs ASET as part of the study to support the code change are appropriate."

During the Committee Hearings it was noted that the modeling included several conservative assumptions. Arup reviewed the significant assumptions and offered the following comments:

- "We have found that the simplifications made in the construction of the geometric model are based on industry standard and reasonable engineering judgement. The models are simplified but are understood to capture the physics of fire effects and evacuation movement within the simulated space sufficiently."
- With respect to the occupant load, Arup stated that the approached used "likely overestimates the actual occupant loads on all levels of a typical fab facility and leads to conservative estimations of the RSET and is conservative and appropriate."
- With respect to the three fire scenarios that were evaluated, Arup stated that "Based on typical materials used in construction of the fabrication tools and the fact that raw material feeds were assumed to be interlocked to pause upon detection of an abnormal condition, we believe that the design fire was sized to represent a conservative fire scenario. The multiple locations of the design fire also allow an analysis of fire effects through the fab floor.
- With respect to the criteria used for the tenability analysis, Arup stated that "We agree with the chosen tenability criteria and their tenability limits to be in accordance with reasonable engineering judgement based upon literature data."

Overall, Arup summarized that they agree "with Jensen Hughes' approach using computational fire effects and evacuation modeling to model the RSET vs ASET at a generic Group H-5 semiconductor fabrication facility. We found the analysis to have been completed in accordance with industry standard practice and is based upon sound engineering judgement. The assessment provides appropriate justification to support the proposed Group H-5 code proposal and the corresponding conditions in order to increase the maximum allowable exit access travel distance from 200 feet to 300 feet."

A copy of the complete Hughes report and Arup review will be made available to any interested parties.

In summary the technical justification for E86-21 is based upon:

- A project initiated and sponsored by the Semiconductor Industry Association Code Committee with technical support from their consultant, Koffel Associates.
- An independent quantitative analysis by a second fire protection engineering firm, Jensen Hughes.
- As requested by the Committee, a third party review by a third firm that offers fire protection engineering services, Arup.

The proponent, the SIA, has done what the Committee requested and therefore we request that the ICC membership approve E86-21 as submitted.

Bibliography: SIA Egress Study Third Party Peer Review Report, Arup, dated June 29, 2021

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The proposal and public comment result in an optional increase in travel distance and as such, the cost of construction will decrease.

Final Hearing Results

E86-21	AS

E88-21

Original Proposal

IBC: 1019.3 (IFC:[BE]1019.3)

Proponents: Jeff Perras, Code Red Consultants, LLC, Code Red Consultants, LLC (jeffp@crcfire.com)

2021 International Building Code

Revise as follows:

1019.3 Occupancies other than Groups I-2 and I-3. In other than Group I-2 and I-3 occupancies, floor openings containing *exit access stairways* or *ramps* shall be enclosed with a shaft enclosure constructed in accordance with Section 713.

Exceptions:

1. *Exit access stairways* and *ramps* within a two-story opening complying with Section 712.1.9. ~~that serve or atmospherically communicate between only two adjacent stories. Such interconnected stories shall not be open to other stories.~~
2. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.
4. *Exit access stairways* and *ramps* in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or *ramp* and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.
5. *Exit access stairways* and *ramps* within an *atrium* complying with the provisions of Section 404.
6. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
7. *Exit access stairways* and *ramps* serving smoke-protected or *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
8. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
9. Exterior *exit access stairways* or *ramps* between occupied roofs.

Reason: There has been inconsistent interpretation of the code language in Section 1019.3-1 by designers and AHJs since it was added in the 2009 IBC. Some interpret the language "open to other stories" to mean entire stories and some interpret it to be isolated areas of the stories. The IBC has always allowed two-story vertical openings as long as they were separated from other floor openings with construction conforming to required shaft enclosures. There used to be a restriction in Section 712.1.9 that prohibited the floor openings from being used for egress. Since this restriction was removed there is been an increase in confusion between the two sections.
This code change proposes to align the two sections and eliminate the confusion for designers and AHJs. Section 712.1.9 requires two-story floor openings to be separated from other floor openings with construction conforming to required shaft enclosures. This separation provides an equivalent level of protection as a horizontal separation and utilizing it for egress should not change that concept. Also, section 1006.3.2 limits the number of stories that occupants can travel to reach an exit, so there really should be a need to prohibit the connected stories from being interconnected with other stories.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will clarify the separation requirements for two-story floor openings used for egress.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it coordinates well with Section 712.1.9 Item 6 which addresses options for shafts. (Vote: 9-4)

Final Hearing Results

E88-21	AS

E96-21

Original Proposal

IBC: 1023.5, 1024.6 (IFC:[BE]1023.5, 1024.6)

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

1023.5 Penetrations. Penetrations into or through *interior exit stairways* and *ramps* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems*.
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication systems.
6. Electrical raceway serving the *interior exit stairway* and *ramp* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements ~~supporting the *interior exit stairway* or *ramp* or enclosure,~~ such as beams or joists.

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit *stairways* and *ramps*.

Exception: *Membrane penetrations* shall be permitted on the outside of the *interior exit stairway* and *ramp*. Such penetrations shall be protected in accordance with Section 714.4.2.

1024.6 Penetrations. Penetrations into or through an *exit passageway* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems.*
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication.
6. Electrical raceway serving the *exit passageway* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. <u>Structural elements such as beams and joists</u>.

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

Exception: *Membrane penetrations* shall be permitted on the outside of the *exit passageway*. Such penetrations shall be protected in accordance with Section 714.4.2.

Reason: Item 7 for structural element penetrations in interior exit stairways and ramps was added in the last code cycle with the intent of matching the allowance for structural element penetrations in shaft enclosures. The reason statement for this change (E98-18) stated that the proposed language is verbatim to that found in Section 713.8 for shaft enclosures. However, the wording was actually changed from "Structural elements, such as beams or joists" to "Structural elements supporting the *interior exit stairway* or *ramp* or enclosure, such as beams or joists". The effect of requiring the structural element to support the stairway, ramp or enclosure is that floor or landing beams and joists are allowed to penetrate stairway enclosures, but roof beams and joists are not. Since fire barriers that form the enclosure are required to continue to the underside of the roof deck or sheathing, it is necessary to include roof beams and joists as allowed penetrations since these are no more hazardous than the floor or landing penetrations. This proposal does this by simply removing the language that is different from the language in Section 713.8 for shaft enclosures. This proposal also adds this same Item 7 to the list of allowed penetrations in exist passageways. The intent of the code is that allowed penetrations are the same for interior exit stairways and ramps and exit passageways, since these are all protected exit elements.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will allow structural penetrations that currently not allowed, which will simplify framing at exit enclosures, thus reducing cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved because the result would be a mishmash between rating of stairway enclosure and construction ratings. The current text is only for supporting the stair, not all construction. The proposal did not limit this to roof members which is what the proponent said his concern was. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1023.5 Penetrations . Penetrations into or through *interior exit stairways* and *ramps* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems*.
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication systems.
6. Electrical raceway serving the *interior exit stairway* and *ramp* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements <u>supporting the *interior exit stairway* or *ramp* or enclosure,</u> such as beams or joists.
8. <u>Structural elements supporting a roof at the top of the *interior exit stairway* or *ramp*, such as beams or joists.</u>

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit *stairways* and *ramps*.

Exception: *Membrane penetrations* shall be permitted on the outside of the *interior exit stairway* and *ramp*. Such penetrations shall be protected in accordance with Section 714.4.2.

1024.6 Penetrations . Penetrations into or through an *exit passageway* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.

2. *Fire protection systems.*
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication.
6. Electrical raceway serving the *exit passageway* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements supporting a floor or roof at the top of the *exit passageway,* such as beams and joists.

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

Exception: *Membrane penetrations* shall be permitted on the outside of the *exit passageway*. Such penetrations shall be protected in accordance with Section 714.4.2.

Commenter's Reason: The main opposition to the original proposal was that the language was wide open as to what structural elements would be allowed to penetrate an enclosure. However, the actual intent of the proposal was to allow structural elements that support the roof or floor at the top of an enclosure to penetrate the enclosure. This public comment modification limits the newly allowed penetrations to the intended elements as follows:

- In 1023.5 for interior exit stairways and ramps, the current requirement in Item 7 that the structural elements must support the interior exit stairway or ramp or enclosure is added back in.
- A new Item 8 is then added for structural elements supporting a roof at the top of the interior exit stairway or ramp. Note that this item does not include floors at the top of an interior exit stairway or ramp (where an enclosure stops at a floor instead of a roof) since the floor would be part of the enclosure and structural elements supporting this floor are already allowed by Item 7.
- In 1024.6 for exit passageways, Item 7 is modified by adding a requirement that the structural elements must support a floor or roof at the top of the exit passageway. Floors and roofs are included here since exit passageways don't have an item that covers structural elements that support the enclosure like the interior exit stairways and ramps section does (1023.5 Item 7).

The above changes are consistent with the intent of the code that penetrations are permitted for items that serve the enclosure or are needed for construction of the enclosure.

Another concern raised is that this proposal would allow penetrations by structural elements that may have a fire-resistance rating that is less than required for the enclosure. This concern is not valid as this proposal does not change supporting construction requirements for enclosure walls (Section 707.5.1 for fire barriers), so any member that supports the walls, or supports floors that then support the walls, are required to have a rating that is equal to or great than the rating of the enclosure. Furthermore, where a floor forms the top of the enclosure it is required to have a rating equal to or greater than the enclosure, and the supporting construction requirements for horizontal assemblies (Section 711.2.3) requires the beams or joists that support this assembly to have a rating equal to or greater than the horizontal assembly.

Another item discussed is that Item 7 in 1023.5 was originally added in the 2021 IBC to address platform framing. While Item 7 does address platform framing at floor levels, it does not address platform framing at the roof of an enclosure since these roof beams and joists do not support the enclosure. This proposal would allow platform framing of the roof, which is the logical method of framing the roof if the floors are constructed in this manner. To require the roof to be framed in a different manner than the floors is not reasonable and may be difficult and costly to accomplish. Furthermore, the newly allowed penetrations at the roof level are less hazardous than the floor level penetrations since a premature failure of these penetrations would not immediately affect egress since the smoke and/or fire at the failed penetrations are above the egress path, while the floor penetrations are within the egress path.

Please consider approval of this proposal as modified by this public comment.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This proposal and public comment modification will allow structural penetrations that are currently not allowed, which will simplify framing at exit enclosures, thus reducing the cost of the construction.

Final Hearing Results

E96-21	AMPC1

E97-21

Original Proposal

IBC: 1023.7, 1023.7.1 (New), 1023.7.2 (New) [IFC:[BE]1023.7, 1023.7.1 (New), 1023.7.2 (New)]

Proponents: Lee Kranz, City of Bellevue, WA, Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

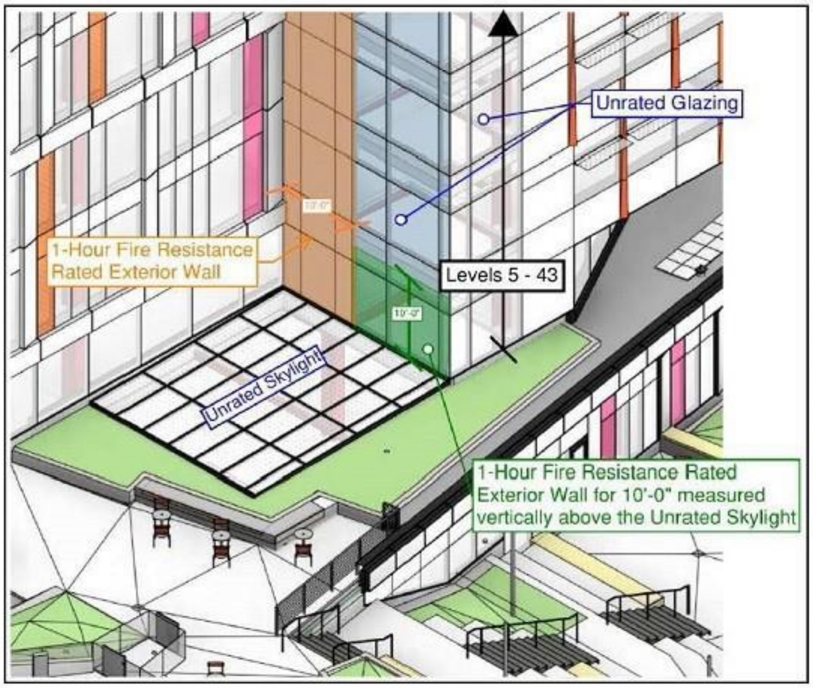
1023.7 Interior exit stairway and ramp exterior walls. *Exterior walls* of the *interior exit stairway* or *ramp* shall comply with the requirements of Section 705 for *exterior walls*. Where nonrated walls or unprotected openings enclose the exterior of the *stairway* or *ramps* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), building construction within 10 feet of the exterior walls of the interior exit stairway or ramp shall comply with Section 1023.7.1 and 1023.7.2. ~~the building *exterior walls* within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a *fire-resistance rating* of not less than 1 hour. Openings within such *exterior* walls shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the *stairway* or *ramp*, or to the roof line, whichever is lower.~~

Add new text as follows:

1023.7.1 Building exterior walls. Building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening in an exterior exit stairway or ramp shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or ramp, or to the roof line, whichever is lower.

1023.7.2 Roof assemblies. Where the interior exit stairway or ramp extends above a roof, the lower roof assembly shall have a fire resistance rating of not less than 1 hour and openings shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. The fire resistance rating and opening protection shall extend horizontally a minimum of 10 feet (3048 mm) from the exterior wall of the stairway or ramp, or to the perimeter of the lower roof, whichever is less.

Reason: This code change is needed to address designs where nonrated exterior walls of an interior exit stairway or ramp are adjacent to nonrated roof assemblies which may also have unprotected openings within 10 feet of the exterior walls of the stairway or ramp. As you can see in the attached illustration, the unrated glazed exterior wall of the interior exit stairway is directly adjacent to an unprotected skylight in the roof of a lobby below. The designer agreed to protect the exterior wall of the stairway for 10 feet above the skylight but currently there is no language in the code to require it. This proposal provides more comprehensive protection for one of the most important egress elements in Chapter 10, interior exit stairways and ramps.



Cost Impact: The code change proposal will increase the cost of construction
The cost of construction will increase due to more roof assemblies and related openings needing to be of rated construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because there are issues with the language. This proposal missed the option to rate the exterior walls 10 feet up or the roof 10 feet out from the opening. The language in Section 1023.7.2 does not limit the roof to that near the area of concern. (Vote: 10-4)

Public Comments

Public Comment 1

Proponents: Lee Kranz, City of Bellevue, WA, Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1023.7 Interior exit stairway and ramp exterior walls . *Exterior walls* of the *interior exit stairway* or *ramp* shall comply with the requirements of Section 705 for *exterior walls*. Where nonrated walls or unprotected openings enclose the exterior of the*stairway* or *ramps* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), building construction within 10 feet of the exterior walls of the interior exit stairway or ramp shall comply with Section 1023.7.1 and 1023.7.2.

1023.7.1 Building exterior walls . Building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening in an ~~exterior~~ interior exit stairway or ramp shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or ramp, or to the roof line, whichever is lower.

1023.7.2 Roof assemblies . Where the interior exit stairway or ramp extends above ~~a~~ an adjacent roof of the same building, the ~~lower~~ adjacent roof assembly shall have a fire resistance rating of not less than 1 hour and openings shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. The fire resistance rating and opening protection shall extend horizontally a minimum of 10 feet (3048 mm) from the exterior wall of the stairway or ramp, or to the perimeter of the ~~lower~~ adjacent roof, whichever is less.

Exceptions:

1. The roof assembly need not be rated and openings in the roof need not be protected where they are adjacent to the *penthouse* of the stairway or ramp, unless otherwise required by this code.
2. The adjacent roof assembly need not be rated and adjacent openings in the roof need not be protected where the exterior wall of the stairway or ramp has a fire-resistance rating of 1 hour and openings are protected by opening protectives having a fire protection rating of not less than 3/4 hours, extending a minimum of 10 feet (3048 mm) above the roof.

Commenter's Reason: Where an interior exit stairway or ramp is located at the perimeter of a building, it is subject to risk from fire or smoke from other parts of the building. Section 1023.7 requires protection of the vertical walls and openings adjacent to the enclosure wall(s) less than angles of 180 degrees to the enclosure walls but does not address designs where the enclosure could be exposed to fire or smoke from adjacent roof assemblies.

E97-21 is intended to provide clear direction on measures to keep fire and smoke away from enclosed stairways or ramps in order to maintain tenability of the enclosures. Most, if not all, building and fire officials would agree that the risk of fire or smoke from a roof assembly that is part of, and adjacent to, a stair or ramp enclosure is greater than that from an adjacent wall assembly so it makes sense to include these provisions in the code.
There were constructive suggestions provided by members of the Egress Committee, proponents and opponents during and after the Committee Action Hearings and this public comment has been revised to include those valuable suggestions. The changes contained in this public comment include:

1) clear language that either the exterior wall and openings of the enclosure must be protected or protect the adjacent building wall and/or roof assembly (see Section 1023.7.2, Exception 2, and Figures 1 and 2 below);

2) clarify in the charging language of Section 1023.7.2 that the protection of roof assemblies only applies when it is part of the same building in which the enclosure is located; and

3) exempt roof assemblies adjacent to penthouse structures covering stair or ramp enclosures (see Section 1023.7.2, Exception 1).

We also addressed an error we discovered in 1023.7.1 that mistakenly referred to exterior exit stairways and ramps. It has been corrected to refer to interior exit stairways and ramps.

Figure 1 below illustrates the base requirement in Section 1023.7.2, that the roof assembly and openings in the roof must be protected within 10 feet of the wall of the stairway or ramp enclosure. Figure 2 illustrates the option provided in Section 1023.7.2, Exception 2, allowing protection of the stairway/ramp enclosure wall to a height of 10 feet above the adjacent roof in lieu of protecting the roof assembly. These figures, or something similar, could be included in the IBC Commentary to help code users understand and apply these important passive life safety provisions.

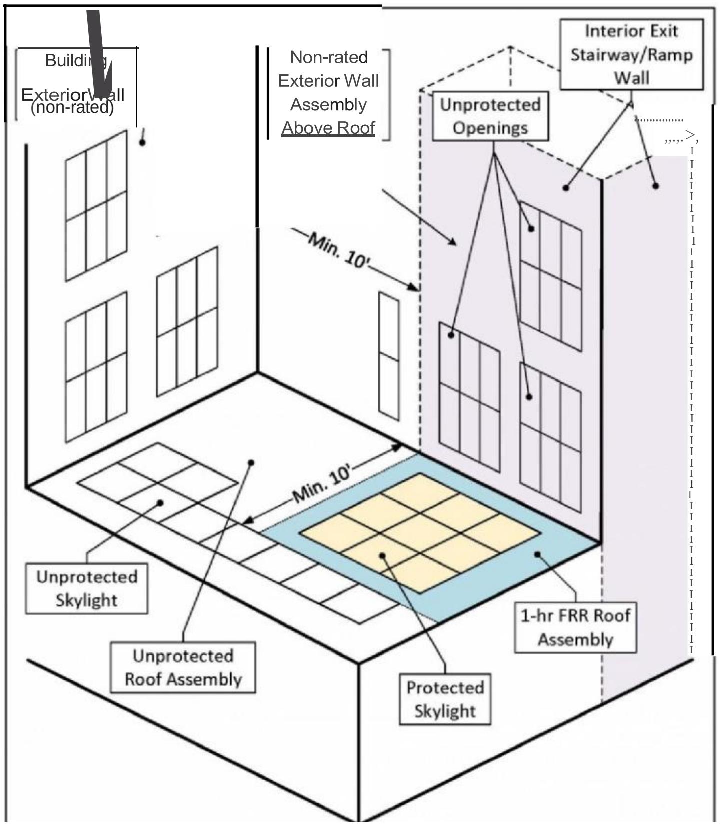


FIGURE1 Protect Roof for 10' => Unprotected Stair Wall /§1023.7.21

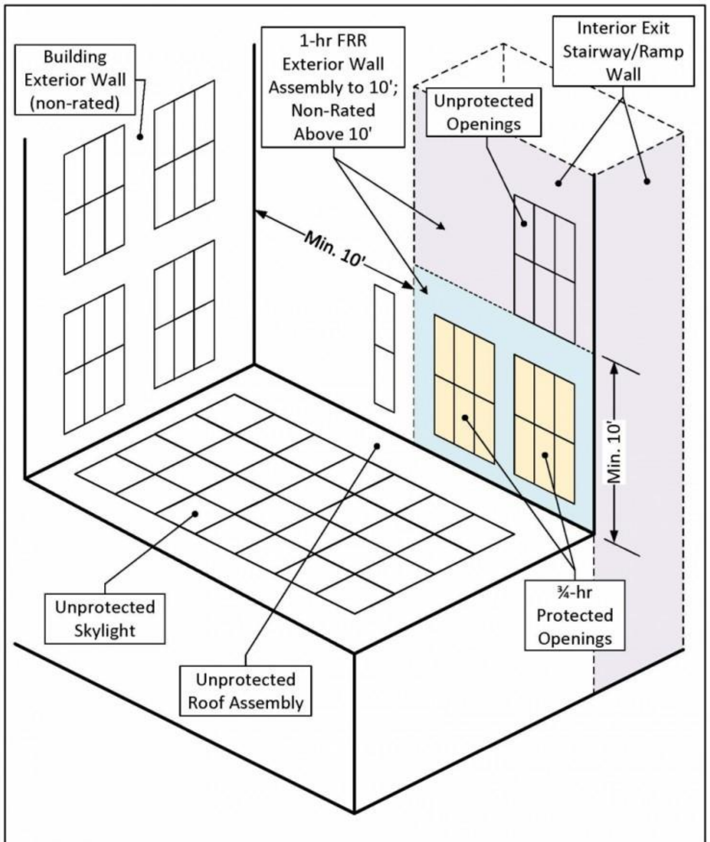


FIGURE 2 – Protect Stair Wall for 10' => Unprotected Building Wall/Roof (§1023.7.2 exc. 2)

In response to a comment we received after the Committee Action Hearings, the requirement for 10 feet of protection above the roof for the stair enclosure wall in 1023.7.2, Exception 2 is consistent with the extent of vertical protection requirements for other components of the means of egress in the current code:

- Protection of the stair enclosure near building exterior walls (IBC 1023.7)
- Protection for exterior areas for assisted rescue (IBC 1009.7.2)
- Protection for exit passageways (IBC 1024.8)
- Protection for exit courts (IBC 1029.3).

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
In some cases, roof assemblies adjacent to interior exit stairways or ramps, or the exterior wall of interior exit stairways or ramps will be required to be 1 hour rated with 3/4 hour rated openings. This will increase the cost of construction when these rated assemblies are provided.

Final Hearing Results

E97-21	AMPC1

E100-21

Original Proposal

IBC: 1027.2 (IFC:[BE]1027.2)

Proponents: Lee Kranz, City of Bellevue Washington, Myself (lkranz@bellevuewa.gov)

2021 International Building Code

Revise as follows:

1027.2 Use in a means of egress. *Exterior exit stairways* shall not be used as an element of a required*means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall be permitted as an element of a required *means of egress* for buildings not exceeding six stories above grade plane ~~or that are not~~ ~~*high-rise buildings*~~.

Reason: The current language in Section 1027.2 is confusing because the two test cases overlap. The first test to determine if an *xeterior exit stairway* can be used as an element of a required means of egress applies to buildings not exceeding 6-stories above grade plane. The second test is that the building cannot be a high-rise. There is no clear direction if it is permissible to use an e*xterior exit stairway* for a 7 or 8-story building that does not meet the definition of a high-rise building. Deleting the high-rise test, which is more liberal than the 6-story test, appears to be the best course of action.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification only. It shouldn't impact the cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that both thresholds - 6 stories above grade plane and highrise- were needed to address sloped sites. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Julius Carreon, City of Bellevue, Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1027.2 Use in a means of egress . *Exterior exit stairways* shall not be used as an element of a required*means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall ~~be permitted~~ <u>not be used</u> as an element of a required *means of egress* for buildings ~~not~~ exceeding six stories above grade plane <u>or that are high-rise buildings</u>.

Commenter's Reason: The original code change proposal of deleting the high-rise test case was disapproved because the committee felt that both thresholds - six stories above grade plane and high rise were needed. This public comment addresses both the committee’s concerns and the confusion created by the current language in Section 1027.2. The current language could be interpreted such that only one of the two test cases is needed to permit the exterior exit stairways and ramps as an element of a required means egress for the building.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is a clarification only. It shouldn't impact the cost of construction.

Final Hearing Results

E100-21	AMPC1

E105-21

Original Proposal

IBC: 1029.3 (IFC:[BE]1029.3)

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

Revise as follows:

1029.3 Construction and openings. Where an *egress court* serving a building or portion thereof is less than 10 feet (3048 mm) in width, the *egress court* walls shall have not less than 1-hour *fire-resistance-rated* construction for a distance of 10 feet (3048 mm) above the floor of the *egress court*. Openings within such walls shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour.

Exceptions:

1. *Egress courts* serving an *occupant load* of less than 10.
2. *Egress courts* serving Group R-3.
3. <u>Egress courts, located at *grade,* whichprovide direct and unobstructed access to a *public way* through two or more independent paths. The required width or capacity shall be maintained along each path.</u>

Reason: The proposed code change adds an exception to allow omission of opening protection from openings in walls adjacent to egress courts where occupants have access to the public way through two different paths, in other words from a yard designed to comply as an exit court that has two outlets. This will reduce the cost of construction and will allow design flexibility.

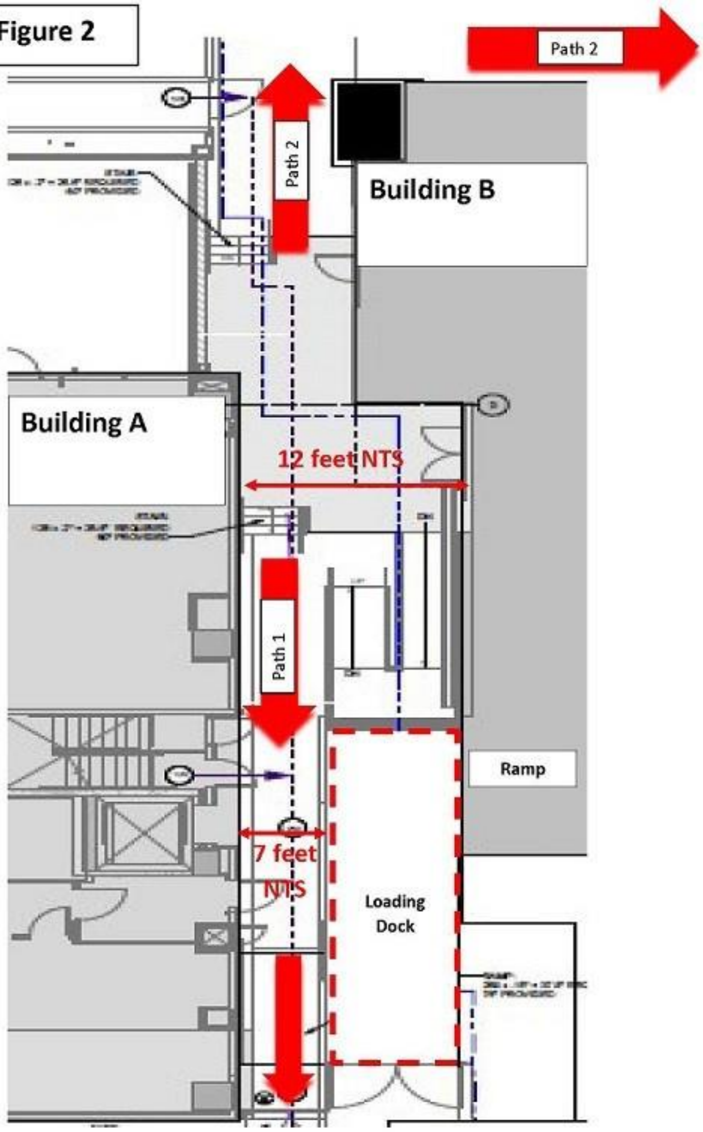
- Protection will not be diminished since the exterior walls for almost all buildings located at an FSD less than 10 feet will have a fire resistance of at least 1-hour and exterior wall openings will be restricted to 25% of the area of the wall (10% if not fire sprinklers).
- Additionally most buildings are protected with fire sprinkler systems and the IBC does account this additional level of protection.

This Code change recognizes the benefit of the egress path within an exit court being located far enough away from the building requiring the egress court. So by providing multiple paths occupants do not have to select the path that may have been compromised by fire in the building from which they accessed the egress court.

- The 2018 IBC commentary explains that an egress court, which is a portion of the exit discharge, is "A portion of the exit discharge that is partially confined by exterior walls or other elements that confine the discharge path to a single narrow route ..." This code change recognizes the benefits of multiple paths.
- The 2018 IBC Commentary on page 10-186 also includes a clarification that "The purpose of this section is to protect the occupants served by the egress court from the building that they are exiting. If occupants must walk closely by the exterior walls of the court, the walls are required to have the specified fire-resistance rating and the openings are required to be protected as specified." The proposed exception recognizes the benefits of two outlets from an exit court that does not require occupants to walk along a particular path.
- The 2018 IBC Commentary also explains that "An exit discharge component could be a large exterior open space where occupants could discharge in a number of different directions or it could be limited to a narrower path by landscaping or walls (i.e., egress court). In all cases, the space must be open enough to the outside that smoke and fumes will vent upward and away from occupants evacuating the building." The proposed exception allows the egress court with multiple outlets to be have like a a surface parking lot in front of the building

In closing, if occupants have choices of paths it is reasonable to assume that one of the alternative paths will be available and provide safe access to the public way and therefore protection of the exit court is not required. See figure 2 attached for an illustration of this concept. We request that the Means of Egress Committee approve this sensible code change.

Figure 2



Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will reduce the need to add opening protectives at doors and windows along egress courts.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved because this proposal does not indicate the larger of width versus capacity for the size. This could be read to be exempting rated walls and openings. The proposal seems to be assuming the buildings are sprinklered. (Vote: 12-1)

Public Comments

Public Comment 1

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1029.3 Construction and openings . Where an *egress court* serving a building or portion thereof is less than 10 feet (3048 mm) in width, the *egress court* walls shall have not less than 1-hour *fire-resistance-rated* construction for a distance of 10 feet (3048 mm) above the floor of the *egress court*. Openings within such walls shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour.

Exceptions:

1. *Egress courts* serving an *occupant load* of less than 10.
2. *Egress courts* serving Group R-3.
3. Egress courts, located at *grade,* which provide direct and unobstructed access to a *public way* through two or more independent paths. The minimum width provided along each path shall be based on the required width or the required capacity, whichever is greater, and shall be maintained along each path.

Commenter's Reason: We request that the ICC Governmental Voting members overturn the committee decision for disapproval so that we can over come the 2/3 vote hurdle necessary to consider approval as submitted with further modification per public comment. The Public Comment is submitted in response to feedback provided by the Means of Egress Committee which supported the code change in concept. While the reason statement intended to point out that most buildings will be protected with fire sprinklers and that the exterior walls located at a fire separation distance less than 10 ft will in the vast majority of cases be 1-hour fire resistant with a significant reduction in the permitted area of exterior wall openings. The proposed code change does not require the presence of fire sprinklers and recognizes the benefits of alternative paths regardless of the type of construction, occupancy and protection for the building. The example provided is intended to be illustrative of a condition that occurred in a local jurisdiction where the IBC was silent regarding the benefits of equivalent alternative paths to the public way. The net effect of the updates in the public comment ensure that the larger of the width or calculated capacity be provided along the alternative paths to the public way.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The proposed code change will not require opening protection when alternative paths are provided.

Final Hearing Results	
E105-21	AMPC1

E108-21

Original Proposal

IBC: 1030.8 (IFC:[BE]1030.8)

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

1030.8 Common path of egress travel. The *common path of egress travel* <u>for a room or space used for assembly purposes having fixed seating</u> shall not exceed 30 feet (9144 mm) from any seat to a point where an occupant has a choice of two paths of egress travel to two *exits*.

Exceptions:

1. For areas serving less than 50 occupants, the *common path of egress travel* shall not exceed 75 feet (22 860 mm).
2. For *smoke-protected* or *open-air assembly seating*, the *common path of egress travel* shall not exceed 50 feet (15 240 mm).

Reason: Footnote c of Table 1006.2.1 states "For a room or space used for assembly purposes having fixed seating, see Section 1030.8". Therefore, the shorter common path of travel in Section 1030.8 does not apply to areas that do not have fixed seating. The common path of travel in the table applies to those uses. However, the existing language in Section 1030.8 is written in such a way that it would apply to all assembly uses as outlined in Section 1030.1. This proposal eliminate the conflict between the two sections and clarifies the intent of the provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is designed to eliminate a conflict in the code and clarify the language.

Staff note: This proposal's revision to Section 1030.8 addresses requirements in a different or contradicting manner to those found in Code Change E14-21 to Table 1006.2.1 footnote c. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this allows for the 75 feet common path of travel for all assembly spaces except fixed seating arrangements. This is coordination with Table 1006.2.1. While wheelchair spaces are not fixed seats, they should match the requirements for the surrounding space. (Vote: 14-0)

Final Hearing Results

E108-21	AS

E109-21

Original Proposal

IBC: 1030.9.5(IFC:[BE]1030.9.5)

Proponents: William Conner, American Society of Theatre Consultants, American Society of Theatre Consultants (bill@bcaworld.com)

2021 International Building Code

Revise as follows:

1030.9.5 Dead-end aisles. Each end of an *aisle* shall be continuous to a cross *aisle*, foyer, doorway, vomitory, concourse or *stairway* in accordance with Section 1030.9.7 having access to an *exit*.

Exceptions:

1. Dead-end *aisles* shall be not greater than 20 feet (6096 mm) in length.
2. Dead-end *aisles* longer than ~~16 rows~~ 20 feet (6096 mm) are permitted where seats beyond the ~~16th row~~ 20 feet (6096 mm) dead-end *aisle* are not more than 24 seats from another *aisle*, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.
3. For *smoke-protected* or *open-air assembly seating*, the dead-end *aisle* length of vertical *aisles* shall not exceed a distance of 21 rows.
4. For *smoke-protected* or *open-air assembly seating*, a longer dead-end *aisle* is permitted where seats beyond the 21-row dead-end *aisle* are not more than 40 seats from another *aisle*, measured along a row of seats having an *aisle* accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

Reason: Currently, dead end aisles are permitted to be 20' or less; or 16 rows or more. (In an auditorium 20 feet is typically 5 or 6 rows; 16 rows is typically 50 to 60 feet.) This change is to permit more than 5 or 6 rows and fewer than 16 or more rows to be served by a dead end aisle; and delete the overly permissive 16 or more without increasing the width of aisle and aisle accessways. This is consistent with 1029.8 common path of travel requirements. (Editorially it would seem better code if instead of repeating the increase in widths here, it simply referenced a modified 1029.8 instead of repeating similar but not equal requirements.)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should not change the typical assembly seating layouts. This is a more specific requirement.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it fixes a hole in the code and provides consistency by providing the length versus number of rows. Theater designers spoke in support and stated that this is common design practice. (Vote: 13-0)

Final Hearing Results

E109-21 AS

E110-21

Original Proposal

IBC: 1030.9.5 (IFC:[BE]1030.9.5)

Proponents: William Conner, American Society of Theatre Consultants, American Society of Theatre Consultants (bill@bcaworld.com)

2021 International Building Code

Revise as follows:

1030.9.5 Dead-end aisles. Each end of an *aisle* shall be continuous to a cross *aisle*, foyer, doorway, vomitory, concourse or *stairway* in accordance with Section 1030.9.7 having access to an *exit*.

Exceptions:

1. Dead-end *aisles* shall be not greater than 20 feet (6096 mm) in length.
2. Dead-end *aisles* longer than 16 rows are permitted where seats beyond the 16th row dead-end *aisle* are not more than 24 seats from another *aisle*, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.
3. <u>Dead-end aisles serving fewer than 50 seats shall be permitted in accordance with Section 1030.8</u>.

~~3.~~<u>4.</u> For *smoke-protected* or *open-air assembly seating*, the dead-end *aisle* length of vertical *aisles* shall not exceed a distance of 21 rows.

~~4.~~<u>5.</u> For *smoke-protected* or *open-air assembly seating*, a longer dead-end *aisle* is permitted where seats beyond the 21-row dead-end *aisle* are not more than 40 seats from another *aisle*, measured along a row of seats having an *aisle* accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

Reason: This added exception permits a low number of seats to be served by a longer dead end aisle as has been the case and is consistent with 1030.8 common path of travel for fewer than 50 and general egress requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will increase options in theater layouts.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as the new exception is has minimal occupants and a common path of travel distance that is reasonable and provides design options. (Vote: 13-0)

Final Hearing Results

E110-21	AS

E111-21

Original Proposal

IBC: 1031.2 (IFC:[BE]1031.2)

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

Revise as follows:

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or *access* to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way*, or to a *yard*, or *court* that opens to a *public way*, or to an egress balcony that leads to a *public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, court or exterior egress balcony that ~~opens~~ that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. Storm shelters are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the basement has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

Reason: The proposed code change has two parts, the first of which recognizes the benefits of an emergency escape and rescue opening (EERO) that provides access to the exterior of a dwelling unit through an egress balcony. The second part of the proposal is to address what the exception intends since language is not clear and can be interpreted in different ways.
There is no doubt that accessing the public way through an egress balcony has significant benefits that simplify rescue operations if necessary since ladder access is not necessary. Additionally, whether through an EERO or an exit door or exit access door, emergency escape into an egress balcony an element of the exit access, provides a reasonable level of safety when occupants leave the sleeping room in the unit of fire origin since they are leaving the hazard and entering progressively better protected elements of the means of egress.

Egress balconies will eventually terminate at an interior exit stairway or exterior exit stairway and in the vast majority of configurations the vertical component will be protected from the building.

The 2018 IBC Handbook page 500 has a superior way of describing the intent of exception 2 than the code itself, and the proposal uses the way that the author of the commentary chooses to explain the requirement. When exception 2 states "to a *public way"* it can mean adjacent to the public way, overlooking a public way. It can also be read that the exception requires the egress balcony to terminate into a public way which is not possible since the egress balcony is on an upper story and needs to access a stairway to get to the public way.

The IBC allows a door to provide for escape and rescue from a sleeping room but not an EERO other than a door so the charging language is updated to add this clarification since a window or door leading to an egress balcony for the most part are equivalent when considering that the EERO is a secondary path in the event the primary path, the unit entry doorway is impeded. It is not likely that exterior rescue will be necessary throughout the EERO or door since the fire department will access the dwelling unit through it's entry door.

While most of the US exempts sprinkler protected buildings from EERO requirements California only does so in types of construction other than type V and IV.

We request that the Means of Egress Committee vote to approve this sensible code change.

1030.1 General. Because so many fire deaths occur as the result of occupants of residential buildings being asleep at the time of a fire, the IBC selectively requires that basements and all sleeping rooms below the fourth story have windows or doors that may be used for emergency escape or rescue. Applicable only to Groups R-3 and R-4 occupancies, as well as Group R-2 occupancies with a single means of egress as permitted by Tables 1006.3.3(1) and 1006.3.3(2), the requirement for emergency escape and egress openings help ensure these single means of egress spaces provide a potential alternate means to escape. The concern is that when residents are sleeping and unaware of their surroundings, a fire will usually have spread before the occupants are aware of the problem, and the normal exit channels will most likely be blocked. The reason for the requirement in basements is that access to the exterior is limited and they are so often used as sleeping rooms. An exception eliminates the requirement for emergency escape and rescue openings for basements and sleeping rooms having direct access by means of an exit door or exit access door to a public way or a yard, court, or exterior exit balcony that leads to a public way. Emergency escape and rescue openings are also not required in basements with a limited ceiling height or a small floor area, provided no habitable space is provided. Basement sleeping rooms in sprinklered Group R-2 and R-3 dwelling and sleeping units are not required to be provided with an escape and rescue opening provided one of two conditions occurs in the basement, giving occupants a choice of two paths of travel or escape.

The scope of this section is of particular importance as it applies to Group R-2 occupancies. Where at least two exits, or access to at least two exits, are provided on each story of a Group R-2 building, then the provisions of Tables 1006.3.3(1) and 1006.3.3(2) are not applicable. Therefore, the provisions of Section 1030 addressing emergency escape and rescue openings also do not apply. However, where the allowances of Table 1006.3.3(1) or 1006.3.3(2) permitting a single means of egress are used, then the Group R-2 dwelling units must be provided with complying emergency escape and rescue openings. In those situations where, in multistory buildings, one or more stories may have access to two or more means of egress and there are other stories with access to only one exit, the requirements of this section would only be applied to those stories with access to just one exit.

The code intends that the openings required for emergency escape or rescue be located on the exterior of the building so that rescue can be affected from the exterior or, alternatively, so that the occupants may escape from that opening to the exterior of the building without having to travel through the building itself. Therefore, where openings are required, they shall open directly onto a public street, public alley, yard, or court. This provision ensures that continued egress can be accomplished after passing through the emergency escape and rescue opening.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will allow the use of windows as EERO to access egress balconies and adds further clarification as to how to apply one o the exceptions

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as emergency escape and rescue openings should be able to exit to egress balconies and because this configuration would be limited to single exit Group R-2 occupancies. This would provide additional options for design. (Vote: 11-1)

Final Hearing Results

E111-21	AS

E114-21

Original Proposal

IBC: 1103.2.11, 1108.6.3, 1108.6.3.1 (New), 1108.6.3.2 (New)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1103.2.11 Residential Group R-1 or R-3. Buildings of Group R-1 containing not more than five *sleeping units* for rent or hire that are also occupied as the residence of the proprietor are not required to comply with this chapter. Buildings of Group R-3 congregate living facilities (transient) or boarding houses (transient) containing not more than five sleeping units for rent or hire that are also occupied as the residence of the proprietor are not required to comply with this chapter.

1108.6.3 Group R-3. Accessible units and Type B units shall be provided in Group R-3 occupancies in accordance with Sections 1108.6.3.1 and 1108.6.3.2. ~~In Group R-3 occupancies where there are four or more *dwelling units* or *sleeping units intended to be occupied as a residence* in a single structure, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.~~ Bedrooms within *congregate living facilities*, *dormitories*, sororities, fraternities, and *boarding houses* shall be counted as *sleeping units* for the purpose of determining the number of units.

~~**Exception:** The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7~~.

Add new text as follows:

1108.6.3.1 Accessible units. In Group R-3 congregate living facilities (transient) or boarding houses (transient) Accessible sleeping units shall be provided in accordance with Table 1107.6.1.1.

Exceptions:

1. The residence of a proprietor is not required to be an Accessible unit or to be counted towards the total number of units.
2. Facilities as described in Section 1103.2.11 are not required to provide Accessible units.

1108.6.3.2 Type B units. In structures with four or more sleeping units intended to be occupied as a residence, every sleeping unit intended to be occupied as a residence shall be a Type B unit.

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1108.7.

Reason: Group R-3 includes transient facilities with 10 or fewer occupants. The exception for accessibility is facilities with a non-transient proprietor and 5 or fewer guestrooms. Since this is not based on occupant load, the exempted facility could be Group R-1 or R-3. If very small hotels without the residents of the proprietor would be required to include Accessible units. This would align the IBC with the 2010 ADA.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is a clarification for the application of the accessibility requirements for small hotels, not a change in requirement.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this coordinates the ADA exception, that is sometimes called the Mrs. Murphy Bed-n-Breakfast exception, with the Groups for transient lodging in the IBC. (Vote: 14-0)

Final Hearing Results

E114-21	AS

E115-21

Original Proposal

IBC: 1104.5

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com)

2021 International Building Code

Revise as follows:

1104.5 Location. *Accessible routes* shall comply with all of the following:

1. Accessible routes shall coincide with or be located in the same area as a general circulation path.
2. Where the general circulation path is interior to the building, the accessible route shall also be interior to the building.
3. Where only one accessible route is provided, the accessible route shall not pass through kitchens, storage rooms, restrooms, closets or similar spaces.

Exceptions:

1. *Accessible routes* from parking garages contained within and serving *Type B units* are not required to be interior.
2. A single *accessible route* is permitted to pass through a kitchen or storage room in an *Accessible unit, Type A unit* or *Type B unit*.

Reason: This proposal is intended to clarify two things: (1) that the first and second requirements are not interrelated to the extend that complying with one satisfies the other, and (2) that the word "interior" means "interior to the building". Some readers conflate these two requirements and wrongly conclude that locating the accessible route inside the building satisfies requirement #1 to co-locate the accessible route and the general circulation path in the "same general area". The second requirement is intended to prevent the situation where a building by Section 1104.4 to provide vertical access between stories provides an interior stair between stories for people without disabilities and an exterior accessible route connecting two stories for people with disabilities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is for clarification only.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it clarifies that the accessible route needs to comply with all three items in the list. It was suggested that "to the building" be added to the end or Exception 1 for consistency. (Vote: 13-1)

Final Hearing Results

E115-21	AS

E116-21

Original Proposal

IBC: 1105.1.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1105.1.1 ~~Automatic~~ Power-operated doors at public entrances. In facilities with the occupancies and building *occupant loads* greater than indicated in Table 1105.1.1, each *public entrances* ~~that are~~ required to be *accessible* shall have a minimum of one door be ~~either~~ a ~~full~~ *power-operated* door or a *low-energy power-operated door*. Where the accessible *public entrance* includes a vestibule, ~~at least~~ a minimum of one door into and one door out of the vestibule shall meet the requirements of this section.

Reason: This proposal is intended to clarify which entrances and the number of doors at each entrance are affected by this requirement. The proposed revisions are intended to be editorial improvements of Section 1105.1.1, and are intended to be consistent with the intent of the E115-18. The table column heading says 'greater than', but that phrase is not in the charging text.
This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1105.1.1 Power-operated doors at public entrances. In facilities with the occupancies and building *occupant loads* greater than indicated in Table 1105.1.1, each *public* entrance ~~*entrances*~~ required to be *accessible* shall have a minimum of one door be a *power-operated* door or a *low-energy power-operated door*. Where the accessible *public entrance* includes doors in series, such as a vestibule, a minimum of one ~~door into and one door out of the vestibule~~ set of two doors in series shall meet the requirements of this section.

Committee Reason: The modification clarifies what happens with a vestibule and is consistent with the terminology in the ICC A117.1. The proposal was approved as it provides clarification for the power operated doors at the public entrances. (Vote: 14-0)

Final Hearing Results

E116-21	AM

E118-21

Original Proposal

IBC: 1105.1.1

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

1105.1.1 Automatic doors. In facilities with the occupancies and building *occupant loads* indicated in Table 1105.1.1, *public entrances* that are required to be *accessible* shall have one door be either a full *power-operated* door or a *low-energy power-operated door*. Where the *public entrance* includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.

Exception: For the purpose of determining *power-operated* door requirements, a tenant space with its own exterior *public entrance* shall be considered a separate facility and building.

TABLE 1105.1.1 PUBLIC ENTRANCE WITH POWER-OPERATED DOOR[a]

OCCUPANCY	BUILDING OCCUPANT LOAD GREATER THAN
A-1, A-2, A-3, A-4	300
B, M, R-1	500

a. In mixed-use facilities where the total sum of the building occupant load is greater than those listed, the most restrictive building occupant load shall apply.

Reason: This proposal is intended to clarify how the power-operated door requirement is applied to a tenant space that has its own exterior public entrance. When a tenant space has its own exterior public entrance it functions as a facility that is separate from the building as a whole and should be treated as such for power-operated door requirements. This proposal requires these tenant spaces to be considered a separate facility and building for power-operated door requirements (note that the terms facility and building are both used since this section and associated table use both terms). Following are three scenarios with requirements as this section is currently written and as proposed:

Scenario 1: Tenant space does not exceed occupant limits in Table 1105.1 and remainder of building does not exceed limits, but total building does exceed limits. As currently written, public entrances to the tenant space and the remainder of the building are required to have power-operated doors based on the total building occupant load. As proposed, no power-operated doors are required.

Scenario 2: Tenant space exceeds occupant limits in Table 1105.1 and remainder of building does not exceed limits. As currently written, pubic entrances to the tenant space and the remainder of the building are required to have power-operated doors based on the total building occupant load. As proposed, tenant space is required to have power-operated doors but remainder of building is not.

Scenario 3: Tenant space does not exceed occupant limits in Table 1105.1 and remainder of building does exceed limits. As currently written, public entrances to the tenant space and the remainder of the building are required to have power-operated doors based on the total building occupant load. As proposed, tenant space is not required to have power-operated doors, but remainder of building is.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will result in power-operated doors being required at fewer locations, so the cost of construction will decrease.

Staff note: E117-21 and E118-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it was preferred over E117-21. This would allow for strip malls to not require automatic doors for every small tenant space. There was a concern that this is confusing by using "separate facility or building" when you are not limited by exterior walls or fire walls. (Vote: 14-0)

Final Hearing Results

E118-21	AS

E119-21

Original Proposal

IBC: 1105.1.1, TABLE 1105.1.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1105.1.1 Automatic doors. In facilities with the occupancies and building*occupant loads* indicated in Table 1105.1.1,*public entrances* that are required to be *accessible* shall have one door be either a full*power-operated* door or a *low-energy power-operated door*. Where the *public entrance* includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.

<u>**Exception:** In mixed-use facilities, where the total building occupant load for the occupancies listed in the table is calculated as the sum of the ratios of the actual occupant load of each occupancy divided by the building occupant load threshold of each occupancy in Table 1105.1.1, and the sum of the ratios does not exceed 1, the requirements of Section 1105.1.1 do not apply. Where the sum of the ratios is equal to 1 or greater, the requirements of Section 1105.1.1 are applicable.</u>

TABLE 1105.1.1 PUBLIC ENTRANCE WITH POWER-OPERATED DOOR[a]

OCCUPANCY	BUILDING OCCUPANT LOAD GREATER THAN
A-1, A-2, A-3, A-4	300
B, M, R-1	500

a. ~~In mixed-use facilities where the total sum of the building occupant load is greater than those listed, the most restrictive building occupant load shall apply.~~

Reason: The intent of this proposal is to replace the footnote (a) to Table 1105.1.1 with an exception to 1105.1.1. Footnote "a" was added to Table 1105.1.1 by E115-18, Public Comment 2. The reason from the proponent for this public comment was that the table did not address mixed occupancies.
The effect of the existing footnote with "most restrictive occupant load shall apply" is that a hotel (Group R-1) that offers breakfast (Group A-2), an exercise room or a swimming pool (Group A-3) as an amenity would be required to provide automatic doors with an occupant load of 300 instead of 500. Another example would be a retail store (Group M) that includes a small coffee shop or fast food establishment (Group A-2).

In addition, the footnote could be read to apply to all mixed use buildings that include one of the occupancies listed and other occupancies not listed in the table. For example: an apartment building (Group R-2) with a one or two-person on-site rental office (Group B), could be required to provide automatic doors.

The proposed exception text is borrowed from 508.4.2 – allowable building area – and revised to be applicable to the application. This would allow for a balanced approach. This would balance the two occupant loads rather than using the most restrictive.

Example:

Hotel with small restaurant, pool or exercise room:

A-3 (75 /300 occupants) + R-1 (350 /500 occupants) = .0.25 + 0.7 = 0.95

IBC **508.4.2 Allowable building area.** In each *story*, the *building area* shall be such that the sum of the ratios of the actual*building area* of each separated occupancy divided by the allowable *building* area of each separated occupancy shall not exceed 1.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There may be a reduction in the cost of construction. For mixed-use buildings, the requirement for automatic door openers at doors required to be accessible may be “triggered” at a slightly higher building occupant load depending on how the original footnote “a” is interpreted, applied, and enforced.

Staff Note: E119-21 and E120-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1105.1.1 Automatic doors. In facilities with the occupancies and building *occupant loads* indicated in Table 1105.1.1, *public entrances* that are required to be *accessible* shall have one door be either a full *power-operated* door or a *low-energy power-operated door*. Where the *public entrance* includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.
Exception: In mixed-use facilities, where the total building occupant load for the occupancies listed in the table is calculated as the sum of the ratios of the actual occupant load of each occupancy divided by the building occupant load threshold of each occupancy in Table 1105.1.1, and the sum of the ratios ~~does not exceed~~ <u>is less than</u> 1, the requirements of Section 1105.1.1 do not apply. Where the sum of the ratios is equal to 1 or greater, the requirements of Section 1105.1.1 are applicable.

Committee Reason: The modification is to eliminate the overlap of 1 in the calculations. The proposal was approved as the sliding ratio is a fairer approach to mixed occupancy buildings. (Vote: 11-3)

Final Hearing Results

E119-21 AM

E121-21

Original Proposal

IBC: 1106.3, 1106.3.1 (New)

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Building Code

Revise as follows:

1106.3 Groups I-1, R-1, R-2, R-3 and R-4. *Accessible* parking spaces shall be provided in Group I-1, R-1, R-2, R-3 and R-4 occupancies in accordance with <u>the greatest number of parking spaces of any of the following</u>:~~Items 1 through 4 as applicable~~.

1. In Group R-2, R-3 and R-4 occupancies that are required to have Accessible, Type A or *Type B dwelling units* or *sleeping units*, at least 2 percent, but not less than one, of each type of parking space provided shall be accessible.
2. In Group I-1 and R-1 occupancies, accessible parking shall be provided in accordance with Table 1106.2.
3. Where at least one parking space is provided for each *dwelling unit* or *sleeping unit*, at least one *accessible* parking space shall be provided for each *Accessible* and *Type A unit*.
4. ~~Where parking is provided within or beneath a building, *accessible* parking spaces shall be provided within or beneath the building~~.

Add new text as follows:

<u>**1106.3.1 Parking beneath a building.**</u> <u>Where parking is provided within or beneath a building, accessible parking spaces shall be provided within or beneath the building.</u>

Reason: To clarify that the required number of parking spaces should result in the greatest number based on the conditions noted. A similar code change was presented as a public comment to E117-18. This proposed language addresses the concerns the committee had with regards to the placement of the clarification language.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Whether or not the code change proposal will increase or decrease the cost of construction depends upon how jurisdictions have been interpreting item 3 of section 1106.3. If jurisdictions have been interpreting that accessible parking spaces required by item 1 of section 1106.3 do not include the accessible parking spaces required by item 3 of section 1106.3 (which must be also be additionally provided), this will not increase construction costs. The reason for this is that the jurisdiction's interpretation of items 1 and 3 of section 1106.3 is consistent with the code change proposal, that reflects the intent of the code. If jurisdictions have been interpreting that accessible parking spaces required by item 1 of section 1106.3 include the accessible parking spaces required by item 3 of section 1106.3, this will increase construction costs. The reason for this is that the jurisdiction's interpretation of items 1 and 3 of section 1106 3 is not consistent with the code change proposal and additional accessible parking spaces and their accompanying accessible access aisles and accessible routes will be required.

Staff Note: E121-21, E122-21 and E123-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as the best option of E121, E122 and E123. The proponents should work together to add the best options from all three in a public comment. Separating parking beneath the building (Item 4) into a new section provides a good clarification. This proposal clarifies that items 1 and 3 are not additive. (Vote: 9-5)

Public Comments

Public Comment 1

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com); Stephen Thomas, Shums Coda Associates, Self (sthomas@coloradocode.net); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1106.3 Groups ~~I-1, R-1,~~ R-2, R-3 and R-4 . *Accessible* parking spaces shall be provided in Group~~I-1, R-1,~~ R-2, R-3 and R-4 occupancies in accordance with the greatest number of parking spaces of any of the following:

1. In Group R-2, R-3 and R-4 occupancies that are required to have Accessible, Type A or *Type B dwelling units* or *sleeping units*, at least 2 percent, but not less than one, of each type of parking space provided shall be accessible.
2. ~~In Group I-1 and R-1 occupancies, accessible parking shall be provided in accordance with Table 1106.2~~.
<u>2.</u>3. Where at least one parking space is provided for each *dwelling unit* or *sleeping unit*, at least one *accessible* parking space shall be provided for each *Accessible* and *Type A unit*.

~~1106.3.1~~<u>1106.7.1</u> Parking <u>located</u> beneath a building . Where parking is provided ~~within or~~ beneath a building, accessible parking spaces shall be provided ~~within or~~ beneath the building.

Commenter's Reason: The committee had a lengthy discussion on E121, E122 and E123. They approved E121 asking the three of us to work together to put together the best options from all three code changes. This public comment is the result of that collaboration. We have moved the parking beneath the building to be in the section which would be more applicable as far as being a subsection of the location of accessible parking.
We have removed the references to the I-1 and R-1 occupancies as those are provided for elsewhere.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
There is a possibility that this code change could decrease the cost of construction as it now clearly indicates what accessible parking is required. Previous code language could have been confusing and generating the need for additional accessible parking. Overall, it should not have any impact as it is just providing clear direction on what accessible parking is required.

Final Hearing Results

E121-21	AMPC1

E124-21

Original Proposal

IBC: 1107.2

Proponents: Michael Gentille, PCNA Consulting Group, Inc., PCNA Consulting Group, Inc. (michael@pcnagroup.com)

2021 International Building Code

Revise as follows:

1107.2 Electrical vehicle charging stations. Electrical vehicle charging stations shall comply with Sections 1107.2.1 and 1107.2.2.

> **Exception:** Electrical vehicle charging stations provided to serve Group~~R-2,~~ R-3 and R-4 occupancies are not required to comply with this section.

Reason: Most of the newly constructed Group R-2 occupancy projects are being designed to include Electric Vehicle Charging Stations for use by residents. As such, by incorporating Group R-2 occupancies into the design requirements of Section 1107.2, the residents are guaranteed to be provided with at least one of them to be accessible. At present, they are not. Additionally, the inclusion of these design requirements provides consistency in the design of these features on mixed use projects. At present, if a building has mixed use occupancies (which is quite common in larger and/or high-rise development projects), a designer could arbitrarily designate that 100% of the Electric Vehicle Charging Stations are meant to "serve" the Group R-2 occupants, but not the Group B occupants. This would mean that NONE of the EVCS spaces on a site (or within a parking garage) would be required to incorporate accessibility features. Under current code language, there is no way to determine how these spaces are allocated by occupancy group. Ergo, it is a loophole on mixed-use projects that include an Group R-2 occupancy. Conversely, the concern for Group R-3 or R-4 occupancies is not as relevant, since these groups are significantly less likely to occur within mixed-use buildings.

Cost Impact: The code change proposal will increase the cost of construction
For Group R-2 occupancies only, the cost is the addition of van-accessible signage to 5% of the total number of Electric Vehicle Charging Stations that are designated to serve the Group R-2 occupancies.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved as the committee felt that a lower limit should be permitted for small Group R-2 occupancies rather than always requiring electrical vehicle charging stations. Options discussed were where Type B units were required, or based on the total number of units. (Vote: 14-0)

Final Hearing Results

E124-21	AS

E125-21

Original Proposal

IBC: 1107.2

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com); Matt Lescher, CCI, CCI (mattl@codeconsultants.com)

2021 International Building Code

Revise as follows:

1107.2 Electrical vehicle charging stations. Electrical vehicle charging stations shall comply with Sections 1107.2.1 and 1107.2.2.

~~**Exception**~~ **Exceptions:**

1. Electrical vehicle charging stations provided to serve Group R-2, R-3 and R-4 occupancies are not required to comply with this section.
2. Electric vehicle charging stations used exclusively by buses, trucks, other delivery vehicles, law enforcement vehicles, and motor pools are not required to comply with this section.

Reason: This exception is modeled after Section1106.2 Exception exempting the same types of parking facilities from the requirement to provide accessible parking space. Vehicle impound parking has not been included in the list because we think it doubtful that the towing company will be so kind as to charge your car while it is in their care. If the committee wants to add EV charging located at vehicle impound lots, they should also include the conditional requirement found in Section 1106.2 Exception that a passenger loading zone must be provided where the lot is accessed by the public.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this is an exception, it is optional and will not increase or decrease costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as the new exception is reasonable and logical. These type of parking areas are not for public use and a limited access employee only areas. (Vote: 14-0)

Final Hearing Results

E125-21 AS

E127-21

Original Proposal

IBC: 1108.3

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com)

2021 International Building Code

Revise as follows:

1108.3 Accessible spaces. Rooms and spaces available to the general public or available for use by residents and serving Accessible units, *Type A units* or *Type B units* shall be *accessible*. *Accessible* spaces shall include, but are not limited to, toilet and bathing rooms, kitchen, living and dining areas and any exterior spaces, including patios, terraces and balconies.

Exceptions:

1. *Stories* and *mezzanines* exempted by Section 1108.4.
2. Recreational facilities in accordance with Section 1111.2.
3. Exterior decks, patios or balconies that are part of *Type B units* and have impervious surfaces, and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the unit.

Reason: This should not be an exhaustive list. For example, occupancies having dwelling units often have common use spaces such as bike storage areas, dog wash stations, small entertainment centers or movie theaters, and other common use rooms and spaces that are not listed in the current requirement and that must be accessible in accordance with the Fair Housing Act or the ADA.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As noted in the reason statement, this is primarily a clarification to coordinate with federal laws including, but not limited to, the Americans with Disabilities Act and the Fair Housing Act.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because the laundry list in this section is not all inclusive. (Vote: 14-0)

Final Hearing Results

E127-21 AS

E130-21

Original Proposal

IBC: TABLE 1108.6.1.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

1108.6.1 Group R-1. *Accessible units* and *Type B units* shall be provided in Group R-1 occupancies in accordance with Sections 1108.6.1.1 and 1108.6.1.2.

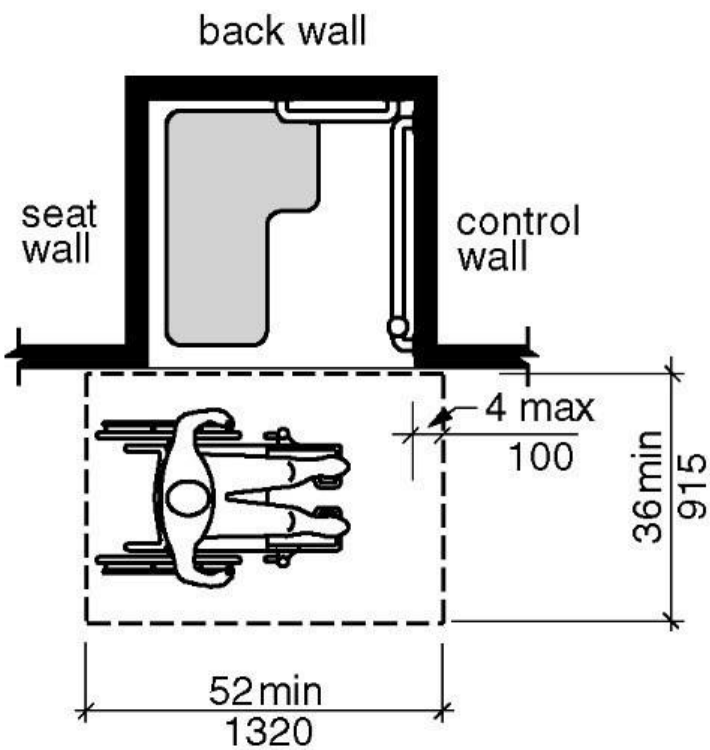
1108.6.1.1 Accessible units. *Accessible dwelling units* and *sleeping units* shall be provided in accordance with Table 1108.6.1.1. On a multiple-building site, where structures contain more than 50 *dwelling units* or *sleeping units*, the number of *Accessible units* shall be determined per structure. On a multiple-building site, where structures contain 50 or fewer *dwelling units* or *sleeping units*, all *dwelling units* and *sleeping units* on a site shall be considered to determine the total number of*Accessible units*. *Accessible units* shall be dispersed among the various classes of units.

Revise as follows:

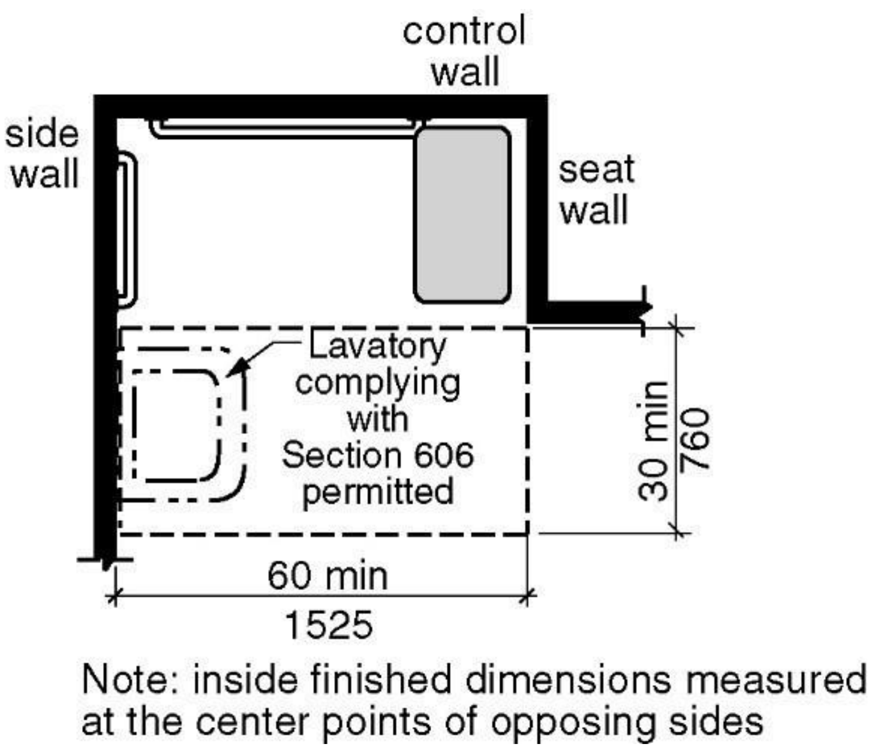
TABLE 1108.6.1.1 ACCESSIBLE DWELLING UNITS AND SLEEPING UNITS

TOTAL NUMBER OF UNITS PROVIDED	MINIMUM REQUIRED NUMBER OF ACCESSIBLE UNITS WITHOUT ROLL-IN SHOWERS	MINIMUM REQUIRED NUMBER OF ACCESSIBLE UNITS WITH ROLL-IN SHOWERS	TOTAL NUMBER OF REQUIRED ACCESSIBLE UNITS
1 to 25	~~1~~	0	1
26 to 50	~~2~~	0	2
51 to 75	~~3~~	1	4
76 to 100	~~4~~	1	5
101 to 150	~~5~~	2	7
151 to 200	~~6~~	2	8
201 to 300	~~7~~	3	10
301 to 400	~~8~~	4	12
401 to 500	~~9~~	4	13
501 to 1,000	2% of total	1% of total	3% of total
Over 1,000	20, plus 1 for each 100, or fraction thereof, over 1,000	10 plus 1 for each 100, or fraction thereof, over 1,000	30 plus 2 for each 100, or fraction thereof, over 1,000

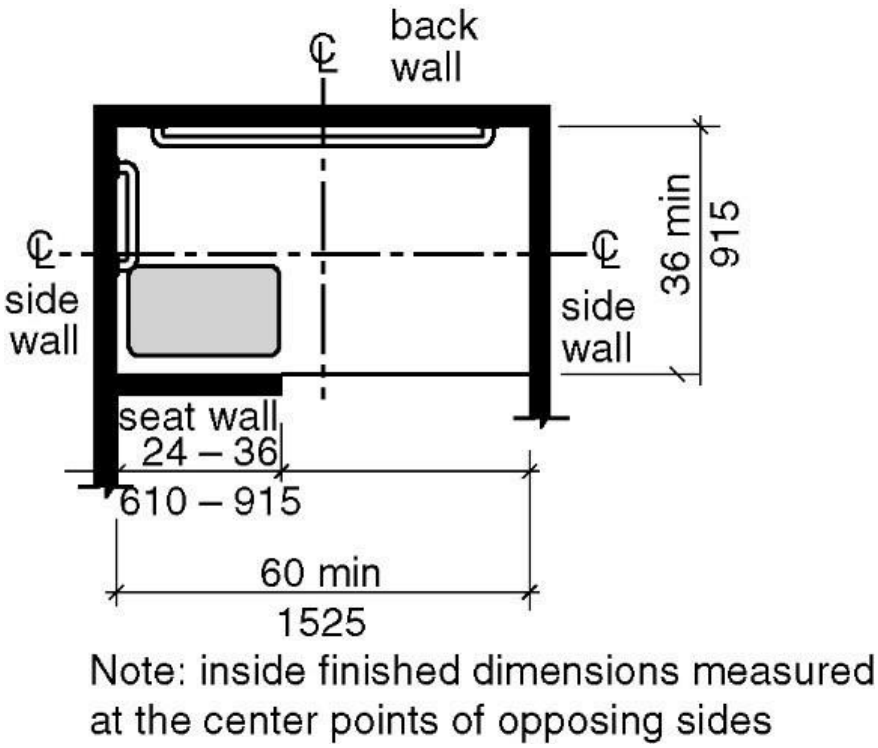
Reason: If a hotel has all showers, Table 1107.6.1.1 could be read to force bathtubs in Accessible rooms. What is the reasoning/justification for this? A roll-in shower with a seat is doing double duty as transfer and roll-in. The table was written originally with the intent to require at least some roll-in showers when hotels typically provided all bathtubs. Designs for bathrooms have changed. Providing showers instead of tubs has been shown to reduce accidental falls in the bathrooms; while continuing to provide accessible options.



Transfer shower



Roll-in shower (also serves as transfer shower)



Alternate roll-in shower (also serves as transfer shower)

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This would increase design options for hotels.

Staff Note: E130-21 and E131-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this will remove the misinterpretation that a hotel has to put in accessible tubs and could not choose to provide a higher level of accessibility and safety by providing all transfer and roll-in showers in the Accessible units. (Vote: 14-0)

Final Hearing Results

E130-21	AS

E131-21

Original Proposal

IBC: 1108.6.1.1

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Douglas Jay Anderson, LCM Architects, American Hotel and Lodging Association (danderson@lcmarchitects.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Revise as follows:

1108.6.1.1 Accessible units. *Accessible dwelling units* and *sleeping units* shall be provided in accordance with Table 1108.6.1.1. On a multiple-building site, where structures contain more than 50 *dwelling units* or *sleeping units*, the number of *Accessible units* shall be determined per structure. On a multiple-building site, where structures contain 50 or fewer *dwelling units* or *sleeping units*, all *dwelling units* and *sleeping units* on a site shall be considered to determine the total number of*Accessible units*. *Accessible units* shall be dispersed among the various classes of units.

> <u>**Exception.** Where all dwelling units and sleeping units contain showers and none contain bath tubs, the total number of required Accessible units specified by Table 1108.6.1.1 shall be permitted to provide standard or alternate roll-in type showers with seats.</u>

Reason: A trend in hotel design is to provide showers and not bathtubs. Although the 2010 ADA Standards require some of the dwelling or sleeping units to have either tubs or transfer showers, the requirement was written in 2004 when this practice was not evident and, in some locations, tubs were required in all units. For most people with disabilities, a roll-in shower with a seat is more accessible than an accessible bathtub or transfer shower. The justification for requiring accessible bathtubs was that some people prefer them and, since other guests have a tub option, people with disabilities should also have that option. However, where the option of a tub instead of a shower is not available to anyone, parity is not at issue and does not make sense.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The exception provides a choice. Depending on the design, applying the exception could result in a decrease in cost because it will minimize the need to design and construct different types of accessible bathrooms.

Staff Note: E130-21 and E131-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved as the committee preferred E130-21. This option would only be available if there were no tubs in the entire hotel - including rooms with both a tub and shower. The language does not allow the option for transfer showers. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal

Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1108.6.1.1 Accessible units . *Accessible dwelling units* and *sleeping units* shall be provided in accordance with Table 1108.6.1.1. On a multiple-building site, where structures contain more than 50 *dwelling units* or *sleeping units*, the number of *Accessible units* shall be determined per structure. On a multiple-building site, where structures contain 50 or fewer *dwelling units* or *sleeping units*, all *dwelling units* and *sleeping units* on a site shall be considered to determine the total number of*Accessible units*. *Accessible units* shall be dispersed among the various classes of units.

~~Exception~~ Exceptions:

1. Where all dwelling units and sleeping units contain showers and none contain bath tubs, the total number of required Accessible units specified by Table 1108.6.1.1 shall be permitted to provide standard or alternate roll-in type showers with seats.
2. Where Exception 1 to Section 1108.6.1.1 is applicable, transfer showers shall be permitted to be substituted for all but the minimum required number of roll-in showers.

Commenter's Reason: We believe that the Committee erred by disapproving this proposal in favor of E130-21. The Committee's own reason for disapproval is why this proposal should be approved as it more closely follows the 2010 ADA Standards. Committee reasons and responses follow:

- *This option would only be available if there were no tubs in the entire hotel - including rooms with both a tub and shower.* Response: That is correct. This proposal respects the principle of parody reflected in the 1991 and 2010 ADA Standards i.e., where people without disabilities do not have a range of choices in bathing fixtures, people with disabilities are not guaranteed a choice.
- *The language does not allow the option for transfer showers.* Response: Our modification adds an option for transfer showers in hotels without bathtubs. However, it does not replace the requirement for a minimum number of roll-in showers, therefore maintaining consistency with the requirement for some roll-in showers in the 2010 ADA Standards.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
Like E130-21, this proposal is not in full and strict compliance with the 2010 ADA Standards. However, unlike E 130-21, this proposal limits exposure to ADA law suits by maintaining consistency with the principle of equal treatment which is at the heart of the ADA. Nonetheless, there is a potential that the change could result in a requirement to retrofit some of the dwelling unit bathrooms.

Final Hearing Results

E131-21	AMPC1

E133-21

Original Proposal

IBC: 1108.6.2.2.1

Proponents: Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com); Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Matt Lescher, Code Consultants, Inc., Code Consultants, Inc. (mattl@codeconsultants.com)

2021 International Building Code

Revise as follows:

1108.6.2.2.1 Type A units. In Group R-2 occupancies containing more than 20*dwelling units* or *sleeping units*, at least 2 percent but not less than one of the units shall be a *Type A unit*. All Group R-2 units on a site shall be considered to determine the total number of units and the required number of *Type A units*. *Type A units* shall be dispersed among the various classes of units. <u>Where two or more Type A units are provided, at least 5 percent but not less than one Type A unit, shall include a bathroom with a shower complying with ICC A117.1 for Type A units.</u>

Exceptions:

1. The number of *Type A units* is permitted to be reduced in accordance with Section 1108.7.
2. *Existing structures* on a site shall not contribute to the total number of units on a site.

Reason: Type A units can include either bathtubs or showers. However, the intent with a Type A unit is to provide features for people's needs that are greater than that in a Type B unit. Unfortunately, for many people a bathtub is quite difficult to transfer into given the various types of disabilities which an individual can have. Where limited upper body strength exists, it is quite difficult trying to lift inert legs other the rim of a bathtub. A shower, with the low threshold would make it much easier to effect a transfer from wheelchair to shower seat. A shower can be essentially the same size and a bathtub or even smaller if a transfer shower is provided. The shower is still an adaptable element - one which has the capability for grab bar installation but does not require them installed at construction. The ratio is still very low. To have two Type A units would require an apartment complex of 80 units. For there to be 2 showers required, the apartment complex would need 2000 units. This is a modest request to provide a better bathing element for a number of individuals with mobility limitations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The space for a shower is the same or even less than that for a bathtub. Depending on the materials and elements selected, the difference is costs often results in the shower being less expensive. An adaptable enclosure is allowed for both bathtubs and showers. This should not affect costs.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved as this is a very minimal increase in accessibility in some Type A units. The roll-in shower will provide for a higher level of access for persons with disabilities than what would be provided by a tub. (Vote: 14-0)

Final Hearing Results

E133-21	AS

E134-21

Original Proposal

IBC: 1108.7, 1108.7.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1108.7 General exceptions. Where specifically permitted by Section 1108.5 or 1108.6, the required number of *Type A units* ~~and *Type B units*~~ is permitted to be reduced in accordance with~~Sections 1108.7.1 through~~ Section 1108.7.5 and the required number of Type B units is permitted to be reduced in accordance with Sections 1108.7.1 through 1108.7.5.

1108.7.1 Structures without elevator service. Where elevator service is not provided in a structure, only the *dwelling units* and *sleeping units* that are located on stories indicated in Sections 1108.7.1.1 and 1108.7.1.2 are required to be~~*Type A units* and~~ *Type B units*, ~~respectively~~. ~~The number of *Type A units* shall be determined in accordance with Section 1108.6.2.2.1~~.

Reason: The intent of this proposal is a clarification on which exceptions are applicable to Type A units and which exceptions are applicable to Type B units. The current text could be misread to believe that all the exceptions apply to both Type A units and Type B units. Section 1108.7 -The current language does not clearly indicate that only the exception in 1108.7.5 is allowed to be used for the reduction of the number of required Type A units. The proposed language is more specific as to which exception is applicable by dividing the allowances for Type A units and Type B units.

Section 1108.7.1 - The language regarding Type A units is not needed in this exception because this exception does not allow for a reduction in the number of Type A units. The last sentence is only a pointer that is not needed.

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Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification. There are no changes in requirements.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved as this provides clarity that not all the exceptions are applicable to Type A units. (Vote: 12-0)

Final Hearing Results

E134-21	AS

E136-21

Original Proposal

IBC: 1109.2, 1109.2.2

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1109.2 Assembly area seating. A building, room or space used for assembly purposes <u>with spectator seating</u> with *fixed seating,* <u>bleachers, grandstands or folding and telescopic seating</u> shall comply with Sections 1109.2.1 through 1109.2.5. Lawn seating shall comply with Section 1109.2.6. Assistive listening systems shall comply with Section 1109.2.7. Performance areas viewed from assembly seating areas shall comply with Section 1109.2.8. Dining areas shall comply with Section 1109.2.9.

1109.2.2 Wheelchair spaces. ~~In rooms and spaces used for assembly purposes with~~~~*fixed seating*~~~~, accessible~~ <u>*Accessible*</u> *wheelchair spaces* shall be provided in accordance with Sections 1109.2.2.1 through 1109.2.2.3.

Reason: The intent of this proposal is to clarify that bleachers, grandstands, and folding and telescoping seating are required to provide accessible wheelchair spaces. The revision "with spectator seating" will match A117.1 terminology.
While fixed seating is defined as including seats with or without backs, the current text is not clear if portable or permanent bleacher systems or folding and telescopic seating have to provide wheelchair spaces. The International Building Code specifies the number of wheelchair spaces for assembly space with 'assembly spaces with fixed seating'. The A117.1 specifies how many groups of wheelchair spaces (wheelchair space locations) and how they are to be dispersed. The text in A117.1 is 'assembly spaces with spectator seating.' The A117.1 does provide some exceptions for the location of the wheelchair spaces in the bleachers (ICC A117.1 802.10.2 Exception 2). The revisions will match A117.1 terminology and clarify that the wheelchair spaces are required in bleachers, grandstands and folding telescopic seating.

ICC 300 Standard for Bleachers, Folding and Telescopic Seating, and Grandstands references the building code for accessibility.

SECTION 310

ACCESSIBILITY

310.1 Accessibility. Tiered seating shall be accessible as required by the building code.

ICC A117.1 Accessible and Usable Buildings and Facilities, includes special allowances for accessible bleacher seating.

SECTION 802

ASSEMBLY AREAS

802.1 General. Wheelchair spaces and wheelchair space locations in assembly areas with spectator seating shall comply with Section 802.

802.10.2 Dispersion for variety of distances from the event. Wheelchair space locations shall be dispersed at a variety of distances from the event to provide viewing options.

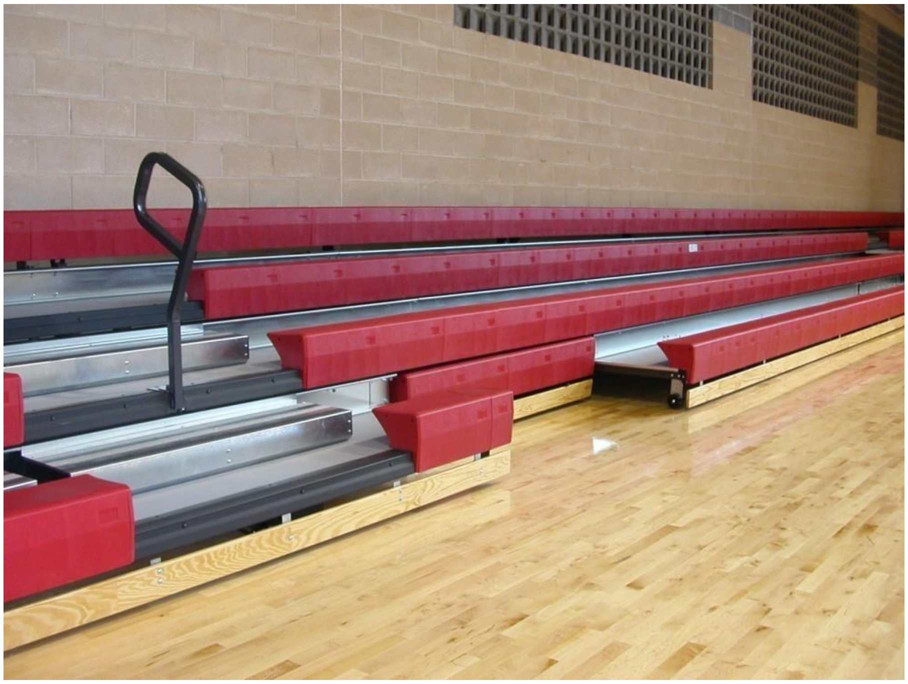
Exceptions:

1. In bleachers, wheelchair space locations provided only in rows at points of entry to bleacher seating shall be permitted.

2. Assembly areas utilized for viewing motion picture projections with 300 seats or less shall not be required to comply with Section 802.10.2.3. Assembly areas with 300 seats or less other than those utilized for viewing motion picture projections shall not be required to comply with Section 802.10.2 where all wheelchair space locations are within the front 50 percent of the total rows.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Examples of bleacher with wheelchair spaces



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification. It is not a change in the requirements for bleachers, grandstands or folding and telescopic seating.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 1109.2 Assembly area seating. A building, room or space used for assembly purposes ~~with spectator seating~~

with fixed seating, bleachers, grandstands or folding and telescopic seating shall comply with Sections 1109.2.1 through 1109.2.5. Lawn seating shall comply with Section 1109.2.6. Assistive listening systems shall comply with Section 1109.2.7. Performance areas viewed from assembly seating areas shall comply with Section 1109.2.8. Dining areas shall comply with Section 1109.2.9.

Committee Reason: The modification was to remove the phrase 'with spectator seating' as it added confusion and could be misinterpreted to only apply to Group A4 and A5 facilities. The proposal was approved as it clarified that bleacher systems, even if they are moveable, are required to incorporate wheelchair spaces as indicated in ICC A117.1. (Vote: 14-0)

Final Hearing Results

E136-21	AM

E138-21

Original Proposal

IBC: 1109.2.9.1, 1110.12, 1110.12.1, 1110.12.2 (New)

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com); Matt Lescher, Code Consultants, Inc., Code Consultants, Inc. (mattl@codeconsultants.com); Gina Hilberry, UCP, United Cerebral Palsy (gina@cohenhilberry.com)

2021 International Building Code

Revise as follows:

1109.2.9.1 Dining surfaces. ~~Where dining~~ Dining surfaces provided for the consumption of food or drink ~~are provided, at least 5 percent, but not less than one, of the dining surfaces for the seating and standing spaces shall be *accessible*~~ shall comply with Section 1110.12. ~~and be distributed throughout the facility and located on a level accessed by an *accessible route*.~~

1110.12 Seating at tables, counters, bars, and work surfaces. Where ~~seating or standing space at~~ fixed, ~~or~~ built-in, or movable tables~~, counters or work surfaces is~~ are provided for the consumption of food or drink ~~in *accessible* spaces~~ , at least 5 percent, but not less than one of the seating and standing spaces at such tables ~~but not less than one~~, shall be *accessible*. Where fixed or built-in counters or bars are provided for the consumption of food or drink, or fixed or built-in work surface are provided, at least 5 percent, but not less than one, of the seating and standing spaces at such counters, bars, and work surfaces shall be accessible.

Exception: Check-writing surfaces at check-out aisles not required to comply with Section 1110.13.1 are not required to be *accessible*.

1110.12.1 Dispersion. *Accessible* ~~fixed or built-in~~ seating at tables, counters, bars, or work surfaces shall be distributed among similar elements located throughout the space or facility containing such elements and, shall be located on a level accessed by an *accessible route*.

Add new text as follows:

1110.12.2 Semi-ambulatory seating. . Where seating is provided at tables for the consumption of food or drink, at least 25 percent of the tables in any indoor or outdoor room or space shall be tables not exceeding 34 inches in height above the floor.

Reason: The revision to Section 1109.1 simplifies the code by reducing potential confusion. Why are there two nearly identical sections addressing standing and seating spaces at tables (one for assembly spaces and another for everything else)? This proposal simply cross references the main section for tables in this section as they both require 5% of seating to be accessible; dispersion within the space; and location on levels served by accessible routes. The requirements for dispersion in 1012.1 is slightly more specific regarding dispersion of accessible tables “among similar elements” in the facility.
This proposal contains two major parts: first, Section 1110.12 would apply the scoping to both fixed and movable tables that are provided for the consumption of food or drink. New Section 1110.12.2 would ensure that seating that is at an appropriate height for persons who are semi-ambulatory is provided in addition to the wheelchair spaces.

Applying scoping to movable tables: The Department of Justice (DOJ) Americans with Disabilities Act (ADA) regulations prohibit discrimination on the basis of disability in all services, programs, and activities offered by public entities and in the operation of privately owned places of public accommodation. According to the DOJ in an Advance Notice of Proposed Rulemaking *Nondiscrimination on the Basis of Disability by State and Local Governments and Places of Public Accommodation; Equipment and Furniture* published in the Federal Register in 2010 : "The provision of accessible equipment and furniture has always been required by the ADA and the Department's implementing regulations under the program accessibility, reasonable modification, auxiliary aids and services, and barrier removal requirements". (75 FR 43452 at https://www.ada.gov/anprm2010/equipment_anprm_2010.htm).Strictly speaking, the ADA Standards apply to the built environment only. However, DOJ suggests that in many cases, the ADA Standards should be applied to furniture: "To the extent that ADA standards apply requirements for fixed equipment and furniture, the Department will look to those standards for guidance on accessibility standards for equipment and furniture that are not fixed". (75 FR 43454). Although the Department later withdrew the proposed rule because of the complexities, wide ranging scope of coverage, and enormous undertaking involved with developing new scoping and technical criteria for many of the types of equipment, the Department still maintains that movable equipment and furniture must be accessible to and usable by individuals with disabilities. Normally, we would not seek to apply the code and its referenced accessibility standard to furniture. However, the IBC already contains scoping and technical requirements for fixed tables consistent with the 2010 ADA Standards. As such, these requirements can easily be applied to similar movable elements without requiring additional training for their review and inspection. Furthermore, furniture plans are already subject to review for most occupancies with tables used for the consumption of food or drink. Without better coordination between the IBC and ADA, restaurants, bars, and other similar facilities will continue to be at risk of a lawsuit. Please note that we do not propose to make this change for counters, bars, and workstations.

New provision for semi-ambulatory seating: Maintaining a more balanced mix of high and low tables will allow persons who may, because of age or disability move with difficulty, but who do not require the use of wheelchairs. Such individuals could be little people or individuals who may use canes, crutches, or walkers and be unable to climb up or down from seats at high tables. Currently, high tables are often used for all seating except for the wheelchair seating. Semi-ambulatory individuals, therefore must compete with wheelchair users for the few tables that are not high in order to be safely and comfortably seated. Because such individuals do not require knee and toe space for a wheelchair, the only factor that needs to be controlled is the height of the table.

Cost Impact: The code change proposal will increase the cost of construction
The impact should be minimal because the Department of Justice Americans with Disabilities Act (ADA) regulations already requires non-fixed elements to be accessible in order to avoid discrimination on the basis of disability. Also, DOJ regulations prohibit discrimination on the basis that an individual must use a mobility device, such as canes, crutches, and walkers.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved for several reasons. The new term 'semi-ambulatory seating' is confusing. There was no justification for the 25% of the tables to have a different level of access in addition to the accessible tables. The proposal adds type of seating as a requirement - so how would someone interpret a 'similar element'. Dining surface requirements should stay in Section 1109. A requirement for 5% of fixed seating and 5% of loose seating does not improve accessibility. The proposed language has removed the requirements for work surfaces in other occupancies. What happens when a facility changes furniture or adds tables? (Vote: 12-2)

Public Comments

Public Comment 2

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gina Hilberry, UCP, United Cerebral Palsy (gina@cohenhilberry.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1110.12 Seating and standing spaces at dining surfaces ~~tables, counters~~ and work surfaces. . Where seating or standing space is provided at ~~fixed or built-in tables, counters~~dining surfaces or work surfaces ~~is provided~~in accessible spaces, ~~at least 5 percent of the~~ such seating and standing spaces~~, but not less than one~~, shall be *accessible* and shall comply with Sections 1110.12.1 through 1110.12.3.

> ~~**Exception:** Check-writing surfaces at check-out aisles not required to comply with Section 1110.13.1 are not required to be *accessible*.~~

1110.12.1 Dining Surfaces . At least 5 percent of the seating and standing space provided at fixed, built-in, and moveable dining surfaces shall be accessible.

1110.12.2 Work Surfaces . At least 5 percent of the seating and standing spaces at fixed or built-in work surfaces shall be accessible.

> **Exception:** Check-writing surfaces at check-out aisles not required to comply with Section 1110.14.1 are not required to be *accessible*.

~~1110.12.1~~ 1110.12.3 Dispersion . *Accessible* ~~fixed or built-in~~ seating and standing spaces at ~~tables, counters or~~ dining and work surfaces shall be distributed throughout the space or facility containing such elements and shall be located on a level accessed by an *accessible route*.

~~1110.12.2~~ 1110.13 Visiting areas . Visiting areas in judicial facilities and Group I-3 shall comply with Sections ~~1110.12.2.1~~ 1110.13.1 and ~~1110.12.2.2~~ 1110.13.2.

~~1110.12.2.1~~ 1110.13.1 Cubicles and counters . At least 5 percent, but not less than one of the cubicles, shall be *accessible* on both the visitor and detainee sides. Where counters are provided, at least one shall be *accessible* on both the visitor and detainee sides.

> **Exception:** This requirement shall not apply to the detainee side of cubicles or counters at noncontact visiting areas not serving *Accessible unit* holding *cells*.

~~1110.12.2.2~~ 1110.13.2 Partitions . Where solid partitions or security glazing separate visitors from detainees, at least one of each type of cubicle or counter partition shall be *accessible*.

Commenter's Reason: This public comment improves the original proposal by:

1. Dropping the proposed changes to Section 1109.2.9.1 which only apply to assembly areas with fixed seating.
2. Dropping the proposed requirement for semi-ambulatory seating.
3. Reformatting Section 1110.12 by adding new subsections 1110.12.2.1 and 1110.12.2.2. One addresses dining surfaces and the other addresses work surfaces.
4. References to "tables" and "counters" in current Section 1110.12.2 are replaced by the term "dining surfaces" which is the term used in current Section 1109.2.9.1. It really doesn't matter whether you are enjoying a meal or a drink at a table or a counter. Furthermore, the term "counter" is often confused with "service counter" and "bar". This change avoids the need to make that distinction.
5. Current code Section 1110.12.2 Visiting areas is unchanged. However, it is removed from Section 1110.12 and renumbered to be a separate Section 1110.13. Like Section 1112.13 *Service facilities*, this section contains provisions unrelated to dining and work surfaces, such as the requirement for partitions separating visitors to be accessible.

The proposed 5% scoping is retained for fixed, built-in, **and moveable** dining surfaces. Moveable work surfaces would not be counted. Please see the reason statement in the original proposal for the justification for applying the scoping to moveable dining surfaces.

Bibliography: For the group, a quick search of the DOJ's website, ADA.gov, indicates a number of case laws that address this issue of fixed and loose furnishings as well as dispersion.
They are:

US v Golden Greek Restauranthttps://www.ada.gov/golden_greek_sa.html

US v Harrisburg Millworkshttps://www.ada.gov/harrisburg_millworks_sa.pdf

US v Il Pomod'Oro Restaurant and Pizzeriahttps://www.ada.gov/il_pomodoro_restaurant_sa.html

US v H&A Group (Market Kitchen and Bar)https://www.ada.gov/market_place_sa.html

And the two famous cases:
US v Mrs. K's Toll House Restaurant https://www.ada.gov/mrs_k_sa.htm
US v OPUS 465 and Tresca https://www.ada.gov/opus465_sa.htm

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The impact should be minimal because the Department of Justice Americans with Disabilities Act (ADA) regulations already requires non-fixed elements to be accessible in order to avoid discrimination on the basis of disability.

Final Hearing Results

E138-21	AMPC2

E139-21

Original Proposal

IBC: 1110.2

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Revise as follows:

1110.2 Toilet and bathing facilities. Each toilet room and bathing room shall be *accessible*. Where a floor level is not required to be connected by an *accessible route*, the only toilet rooms or bathing rooms provided within the facility shall not be located on the inaccessible floor. Except as provided for in Sections 1110.2.4 and 1110.2.5, at least one of each type of fixture, element, control or dispenser in each accessible toilet room and bathing room shall be *accessible*.

Exceptions:

1. Toilet rooms or bathing rooms accessed only through a private office, not for *common* or *public use* and intended for use by a single occupant, shall be permitted to comply with the specific exceptions in ICC A117.1.
2. This section is not applicable to toilet and bathing rooms that serve *dwelling units* or *sleeping units* that are not required to be *accessible* by Section 1108 <u>provided that such toilet or bathing rooms are not for public use</u>.
3. Where multiple single-user toilet rooms or bathing rooms are clustered at a single location, at least 50 percent but not less than one room for each use at each cluster shall be *accessible*.
4. Where no more than one urinal is provided in a toilet room or bathing room, the urinal is not required to be *accessible*.
5. Toilet rooms or bathing rooms that are part of critical care or intensive care patient sleeping rooms serving *Accessible units* are not required to be *accessible*.
6. Toilet rooms or bathing rooms designed for bariatrics patients are not required to comply with the toilet room and bathing room requirement in ICC A117.1. The *sleeping units* served by bariatrics toilet or bathing rooms shall not count toward the required number of Accessible *sleeping units*.
7. Where permitted in Section 1108, in toilet rooms or bathrooms serving Accessible units, water closets designed for assisted toileting shall comply with Section 1110.2.2.
8. Where permitted in Section 1108, in bathrooms serving Accessible units, showers designed for assisted bathing shall comply with Section 1110.2.3.
9. Where toilet facilities are primarily for children's use, required *accessible* water closets, toilet compartments and lavatories shall be permitted to comply with children's provision of ICC A117.1.

Reason: This proposal clarifies that toilet and bathing rooms that do not serve dwelling units or sleeping units that are required to be accessible by Section 1108 , but that are also open to the public such as those in a lobby area, must still be accessible.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase costs where an Accessible or Type A unit is required by the code, but not required to comply with Federal laws such as the ADA the Architectural Barriers Act, or Section 504 of the Rehabilitation Act of 1973. However, the cost of remediation is very high.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because the term 'public use' is confusing and could be interpreted incorrectly - such as would this apply inside a unit? (Vote: 12-2)

Public Comments

Public Comment 1

Proponents: Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.2 Toilet and bathing facilities . Each toilet room and bathing room shall be*accessible*. Where a floor level is not required to be connected by an *accessible route*, the only toilet rooms or bathing rooms provided within the facility shall not be located on the inaccessible floor. Except as provided for in Sections 1110.2.4 and 1110.2.5, at least one of each type of fixture, element, control or dispenser in each accessible toilet room and bathing room shall be *accessible*.

Exceptions:

1. Toilet rooms or bathing rooms accessed only through a private office, not for*common* or *public use* and intended for use by a single occupant, shall be permitted to comply with the specific exceptions in ICC A117.1.
2. This section is not applicable to toilet and bathing rooms~~that serve~~located within *dwelling units* or *sleeping units* that are not required to be *accessible* by Section 1108. ~~provided that such toilet or bathing rooms are not for publicuse.~~
3. Where multiple single-user toilet rooms or bathing rooms are clustered at a single location, at least 50 percent but not less than one room for each use at each cluster shall be *accessible*.
4. Where no more than one urinal is provided in a toilet room or bathing room, the urinal is not required to be*accessible*.
5. Toilet rooms or bathing rooms that are part of critical care or intensive care patient sleeping rooms serving*Accessible units* are not required to be *accessible*.
6. Toilet rooms or bathing rooms designed for bariatrics patients are not required to comply with the toilet room and bathing room requirement in ICC A117.1. The *sleeping units* served by bariatrics toilet or bathing rooms shall not count toward the required number of Accessible *sleeping units*.
7. Where permitted in Section 1108, in toilet rooms or bathrooms serving Accessible units, water closets designed for assisted toileting shall comply with Section 1110.2.2.
8. Where permitted in Section 1108, in bathrooms serving Accessible units, showers designed for assisted bathing shall comply with Section 1110.2.3.
9. Where toilet facilities are primarily for children’s use, required*accessible* water closets, toilet compartments and lavatories shall be permitted to comply with children’s provision of ICC A117.1.

Commenter's Reason: The public comment is seeking to address the issue in the current language where it could be interpreted to exclude any toilet facility in a residential complex. That could include the toilet room in the leasing office or the toilet rooms in the community room or by the swimming pool. These "serve" the residents but not in the sense intended. Rather than use the term public, the public comment clarifies that it is only the toilet and bathing room in the units that are being discussed by the exception.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is a clarification to address the proper intent of what was originally intended.

Final Hearing Results	
E139-21	AMPC1

E141-21

Original Proposal

IBC: 1110.2.1.2

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com)

2021 International Building Code

Revise as follows:

1110.2.1.2 Family or assisted-use toilet rooms. Family or assisted-use toilet rooms shall include only one water closet and only one lavatory. A family or assisted-use bathing room in accordance with Section 1110.2.1.3 shall be considered to be a family or assisted-use toilet room.

Exception: The following additional fixtures shall be permitted in a family or assisted-use toilet room:

1. A urinal.
2. A child-height water closet.
3. A child-height lavatory.
4. An adult changing station.

Reason: This is a companion proposal to our proposal to create a new 1110.3 Adult Changing Stations. Even if the first proposal is not accepted, this one should be approved so that such facilities can be voluntarily provided in family or assisted-use toilet or bathing facilities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is an exception and is therefore voluntary.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved as an adult changing table is not a plumbing fixture, so it does not need to be listed as an exception. Adding this could be read by code official as not allowing other common items, such as baby changing tables or lockers - family/assisted use are currently required to provide the same amenities found in the men's or women's rooms. (Vote: 11-2)

Public Comments

Public Comment 1

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.2.1.2 Family or assisted-use toilet rooms . Family or assisted-use toilet rooms shall include only one water closet and only one lavatory. A family or assisted-use bathing room in accordance with Section 1110.2.1.3 shall be considered to be a family or assisted-use toilet room.

Exception: The following additional plumbing fixtures shall be permitted in a family or assisted-use toilet room:

1. A urinal.
2. A child-height water closet.
3. A child-height lavatory.
4. An adult changing station also used for bathing.

Commenter's Reason: The Committee disapproved this proposal because the items in the list are all "plumbing" fixtures. While it is atypical, adult changing stations can include plumbing as shown in the images below. We would not want this option to be unavailable if someone wishes to provide a bathing option, particularly when the adult changing station is installed in a family or assisted use bathing room.

To address the committee's assertion that the list only applies to "plumbing" fixtures, we inserted the word "plumbing" before "fixtures" in the first sentence of the exception so that it is clear that non-plumbed elements, such as a typical adult changing station without a bathing option is not disallowed.

Examples of Adult Changing Stations Designed for Bathing and Changing

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This section does not require any elements to be installed.

Final Hearing Results

E141-21	AMPC1

E142-21

Original Proposal

IBC: 1110.3 (New), 1110.3.1 (New), 1110.3.2 (New), 1110.3.3 (New), 1110.3.4 (New)

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Jay Richards, State of Ohio, Board of Building Standards (jay.richards@com.state.oh.us); Gina Hilberry, UCP, United Cerebral Palsy (gina@cohenhilberry.com)

2021 International Building Code

Add new text as follows:

1110.3 Adult Changing Stations. Where required, adult changing stations shall be accessible and shall comply with Sections 1110.3.1 through 1110.3.4.

1110.3.1 Where required. At least one adult changing station shall be provided in the building in the occupancies listed below:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required to comply with Section 1110.2.1.
2. In a college or university business occupancy, where an aggregate of twelve or more male and female water closets or urinals are provided on any floor in a building.
3. In an elementary or high school educational occupancy with an assembly use, where an aggregate of six or more male and female water closets is required for that assembly use.
4. In highway rest stops and service plazas.

1110.3.2 Room. Adult changing stations shall be located in toilet rooms open to the public that include only one water closet and only one lavatory. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy.

Exception: Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.3.3 Prohibited location. The required accessible routes to adult changing stations shall not pass-through security checkpoints.

1110.3.4 Travel distance. Where buildings are required to have an adult changing station in accordance with Section 1110.3.1, adult changing stations shall be located such that a person is no more than one story above or below the story with the adult changing station and the path of travel to such facility shall not exceed 2000 feet.

Reason: An adult changing station contains a changing table large enough to accommodate an adult-sized person that is located in proximity to sanitary facilities, such as lavatories and trash disposal. Without such facilities, severely disabled people who cannot use toilets because of their disability suffer from severe isolation because they and their caregivers must return home to be changed. This lack of access has a profound impact not only on the person with a disability, but on their caregivers who are often their immediate family members. Normal activities outside the home such as shopping, entertainment, and travel must be curtailed because of a lack of safe and sanitary places to change. On occasion, caregivers report they have no option other than to change the adults for whom they care on restroom floors. Aside from the obvious sanitation concerns which is far from minimal, this practice raises serious questions about how we as a community afford people with significant disabilities a measure of human dignity and protect their right to privacy.

In order to address this problem, the ICC A117 committee established a task group to develop requirements for adult changing stations. The committee is expected to complete it's work in March, 2021 - in time for consideration by the full committee for inclusion in the next edition of the standard which we expect to be available in time to be referenced by the 2024 IBC. The task group is comprised of committee members and interested parties - many of whom are parents of adult disabled children or who are caring for their parents. While these accommodations are not typically provided in any other type of occupancy, eleven airports, soon to be twelve, in the United States already voluntarily provide adult changing tables. Advocates for adult changing stations have had minimal success outside the code development process through state legislation, such as in California, Georgia, Canada, and the European Union. However, we believe that the building code is a far more appropriate vehicle for solving what amounts to a problem in the built environment and, we are convinced that a patchwork of state and local requirements is inefficient and presents unnecessary compliance challenges to building owners and managers.

Cost Impact: The code change proposal will increase the cost of construction
There will be the cost of a changing table and the increase in room size. We have made every attempt to minimize costs by piggy backing on the existing requirements for family or assisted-use toilet rooms.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved, however it needs a public comment to address some of the language concerns. Adult changing tables are a much needed item to serve some people with disabilities and their caregivers when they are out in public. The technical questions for adult changing table and the rooms they will be located in will be addressed in the next edition of ICC A117.1. Adding to the existing requirements for family/assisted use toilet rooms is a good idea, however the scoping language in Section 1110.3.1 needs some improvement. Section 1110.3.1 Item 2 could be read as the business offices in colleges, and the proponents said the intent was to serve the classrooms and lecture halls. Section 1110.3.1 Item 1 and 3 are redundant. There should be signage requirements for where this is located within the building. Section 1110.3.2 may not be needed if this is addressed in the technical provisions (see the committee action on E141-21). Section 1110.3.4 - if the intent is to require the adult changing tables in every other family/assisted use toilet room in large facilities it may be better to say that rather than set a travel distance that may be read differently. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: David Collins, The Preview Group, Inc, The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1110.3 Adult Changing Stations . <u>Where provided, adult changing stations shall be accessible.</u> Where required, adult changing stations ~~shall be accessible and~~ shall <u>also</u> comply with Sections 1110.3.1 through 1110.3.4.

Commenter's Reason: The Code Committees considered two provisions for adult changint tables. E142 added provisions for adult changing tables in Assembly and Mercantile occupancies, college or university business with an aggregate of twelve or more water closets, elementary or high schools with an assembly use with an aggregate of six or more water closets and highway rest stops and service plazas. This change was approved.

P37 included a very general reference that included no occupancy conditions but requiring that those<u>provided</u> "in addition to the requirements of the IBC" must meet the requirements for location, privacy, etc. This section is an extracted provision whose language would not make sense in Chapter 29 of the IBC. This change failed.

An adult changing station, whether required or voluntarily installed, is a feature providing accessibility for adults and should be addressed totally in Chapter 11 of the IBC. That is where the reference to A117.1 is found and where the provisions for the adult changing station should be located whether required or voluntarily installed.

Please approve this change as modified by the public comment.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
Installations that are not required will be made simpler and provide better access for users if they are directed to provide an accessible feature that meets the A117.1 standard.

Public Comment 2

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com); Jay Richards, State of Ohio, Board of Building Standards (jay.richards@com.state.oh.us); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com); Gina Hilberry, UCP, United Cerebral Palsy (gina@cohenhilberry.com); Lawrence Perry, Lawrence G. Perry, AIA, self (lperryaia@aol.com); Laurel Wright, NCDOI/OSFM - Retired, self (lwwright8481@icloud.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.3 Adult Changing Stations . Where required, adult changing stations shall be accessible and shall comply with Sections 1110.3.1 through 1110.3.4.

1110.3.1 Where required . At least one adult changing station shall be provided inall the following locations ~~the building in the occupancies listed below~~:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are requiredby ~~to comply with~~ Section 1110.2.1.
2. ~~In a college or university business occupancy, where an aggregate of twelve or more male and female water closets or urinals are provided on any floor in a building.~~In Group B occupancies providing educational facilities for students above the 12th grade, where an aggregate of twelve of more male and female water closets are required to serve the classrooms and lecture halls.
3. ~~In an elementary or high school educational occupancy with an assembly use, where an aggregate of six or more male and female water closets is required for that assembly use.~~ In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

1110.3.2 Room . Adult changing stations shall be located in toilet rooms~~open to the public~~ that include only one water closet and only one lavatory. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied.

Exception: Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.3.3 Prohibited location . ~~The required accessible routes to adult changing stations shall not pass-through security checkpoints.~~The accessible route from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

1110.3.4 Travel distance . ~~Where buildings are required to have an adult changing station in accordance with Section 1110.3.1~~,The adult changing ~~stations~~ station shall be located on an accessible route such that a person is no more than~~one story~~ two stories above or below the story with the adult changing station and the path of travel to such facility shall not exceed 2000 feet.

Commenter's Reason: This proposal to require adult changing stations was Approved as Submitted with a vote of 14-0. However, during

testimony, comments requested some clarifications that would improve the content. This public comment addresses that testimony:
1110.3.1 Where required. We simplified the main text by merely pointing to the locations where an adult changing station is required. There was no need to refer to a "building" or to "occupancies" as the list is sufficient.

- Changes to Item#1 are merely editorial - better code language.
- Changes to Item #2 were made to: (1) avoid any misinterpretation that the requirement for an adult changing station applies to office spaces in college buildings; and (2) clarify that the requirements apply to locations where 12 or more water closest are required to serve classrooms and lecture halls.
- Changes to Item #3 include more precise code language regarding Group E. Also, the changes clarify that the scoping applies to individual assembly spaces, such as basketball gyms or theaters in a school, rather than a combination of all assembly spaces. Of course designers always have the option of designing spaces so that a single installation serves more than one assembly area. However, since assembly spaces are often used for after school activities potentially open to the public as well as in-school activities for students nd faculty, we want to be assured that each space is analyzed separately to ensure an accessible route and that spaces are not locked off by gates or other measures preventing access. We want to note that under other state and federal laws, the school must address needs for students with disabilities occupying classrooms and other spaces not covered by this proposal as part of their educational program.
- The change to Item #4 clarifies that the provision applies to rest stops and service plazas that are integral to the highway system i.e., those that are entered and exited from the highway, not to facilities along a travel route where one could come or go from somewhere other than a highway.

1110.3.2 Room. This change is editorial. In the original proposal, the requirement that the toilet room must be "open to the public" was meant to ensure that adult changing stations are available and not locked off during different operating hours, as is often the case in a school where classroom areas are blocked by gates during evening or weekend events. The committee found the phrase "open to the public" to be ambiguous. This change deletes hat phrase and in its place, adds a new sentence to clarify that the goal is to have access to the required facilities.

1110.3.3 Prohibited location. The change to this section clarifies that the accessible route cannot have security checkpoints between the separate sex toilet and bathing facilities and the adult changing station. For example, if everyone in an assembly or mercantile occupancy must first pass through a security checkpoint before they encounter toilet facilities, then the same would be true for people needing an adult changing station.

1110.3.4 Travel distance. This change was made in recognition of the fact thatthe provisions of the IPC allow 500 feet and one story travel distance to a restroom and, where required, another 500 feet and one story to get to a family or assisted use toilet room. The intent is to allow some flexibility in very large facilities, so that some, but not all, of the family or assisted use toilet rooms may not be required to provide an adult changing station. We recognize that the vertical portion o f the accessible route will not be a stair, but will likely be an elevator. Therefore, those needing an adult changing station would potentially have to travel in the elevator two stories versus one.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
In the original proposal, we made every effort to minimize the cost impact. Section 1110.3 of this public comment further minimizes the impact by increasing the travel distance.

Final Hearing Results

E142-21	AMPC1,2

E143-21

Original Proposal

IBC: 1110.3, 1110.4

Proponents: Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com); Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Matt Lescher, Code Consultants, Inc., Code Consultants, Inc. (mattl@codeconsultants.com)

2021 International Building Code

Revise as follows:

1110.3 Sinks. Where sinks are provided, at least 5 percent but not less than one provided in accessible spaces shall be*accessible*.

~~Exception~~ Exceptions:

1. Mop or service sinks are not required to be accessible.
2. For other than sinks in kitchens and kitchenette, where a sink requires a deep basin to perform its intended purpose or requires a specialized drain that cannot be located outside of the knee space, a parallel approach shall be permitted to be located adjacent to the sink.

1110.4 Kitchens and kitchenettes. Where kitchens and kitchenettes are provided in accessible spaces or rooms, they shall be*accessible*.

Exception: Kitchen and Kitchenette sinks shall be permitted to comply with Section 1110.3.

Reason: This is intended to address two needed clarifications.

1110.3

- An added exception is provided that allows a parallel approach to the sink where the sink must be of a kind that a forward approach is not possible. This happens at medical scrub sinks, art sinks, laboratory sinks and similar sinks where caustic or extremely hot liquids may be poured and the sink is of a depth to minimize the potential that these dangerous liquids could splash out and adversely affect the surrounding materials or people. In certain instances, the drain configuration itself, in order to provide this protection, is designed such that adequate knee space is not possible for a forward approach. In these cases, although access is not possible for a forward approach, a parallel approach would still be acceptable, in order to limit the hazard to an individual using a mobility device and yet afford access. In work environments, this can be addressed through reasonable accommodations. However, teaching facilities such as high school art rooms, college labs, teaching hospitals and similar facilities require accessibility since the student station is not an employee work station. This addresses the issue directly without the need to seek a waiver or code modification. Access to the faucet and any other controls would still be required and would still need to be addressed in the design. It provided access but recognizes that different types of sinks may require different solutions for that access.

1110.4

- The exception clarifies that where multiple sinks are provided in a kitchen, it is possible to only have one that is accessible. The current text does not address this clearly. Currently, if the reader simply follows the kitchen and kitchenette path into the A117.1 standard the text there does not help the issue of multiple sinks. The standards states:

804.4 *The sink shall comply with 606.*

Does that mean all sinks; one sink (i.e., "the"); or something else? The exception allows the designer to use the 5 percent option if desired but does not mandate it. This clarifies how and when sinks in kitchens need to be accessible.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification, without cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as a side approach to deep sinks is a practical way to provide access. (Vote: 12-1)

Final Hearing Results

E143-21	AS

E144-21

Original Proposal

IBC: 1111.4.14

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com)

2021 International Building Code

Revise as follows:

1111.4.14 Swimming pools, wading pools, cold baths, hot tubs and spas.*Swimming pools*, wading pools, cold baths, hot tubs and spas shall be *accessible* and be on an accessible route.

Exceptions:

1. Catch pools or a designated section of a pool used as a terminus for a water slide flume shall not be required to provide an *accessible* means of entry, provided that a portion of the catch pool edge is on an*accessible route* or, where the catch pool edge is located on a raised platform, an accessible route serves the gate or area where participants discharge from the activity.
2. Where spas, cold baths or hot tubs are provided in a cluster, at least 5 percent, but not less than one of each type of spa, cold bath or hot tub in each cluster, shall be accessible and be on an *accessible route*.
3. *Swimming pools*, wading pools, spas, cold baths and hot tubs that are required to be*accessible* by Sections 1111.2.2 and 1111.2.3 are not required to provide *accessible* means of entry into the water.

Reason: The "pool edge" of a catch pool serving a water slide is often located above ground on a platform. The purpose of the accessible route requirement to the "pool edge" is to ensure that parents and others with disabilities can meet-up with their parties after they disembark from the ride. This is particularly true for children who need to be under their parent's supervision once they exit the pool. Generally, persons entering and exiting amusement rides are surveilled when inside the pay area. So, when the pool edge is on a platform, an accessible route to the exit point should suffice.
Note: This interpretation does not represent a clearly settled matter under the 2010 ADA Standards. However, we would question the value of a ramp up to a pool edge on a raised platform given that the ride, itself, need not provide an accessible means of entry for a person with a mobility disability. Furthermore, people can often exit a catch pool at multiple points - nothing in the current provision ensures that the location of the accessible route is exactly the same place where any one rider will exit.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal would decrease the cost of construction where catch pools are located above ground.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1111.4.14 Swimming pools, wading pools, cold baths, hot tubs and spas.*Swimming pools*, wading pools, cold baths, hot tubs and spas shall be *accessible* and be on an accessible route.
Exceptions:

1. ~~Catch pools~~ A catch pool or a designated section of a pool used as a terminus for a water slide flume shall not be required to provide an *accessible* means of entry, provided that a portion of the catch pool edge is on an*accessible route* or, where the area at the catch pool edge is ~~located on a raised platform~~ restricted to use by staff and persons exiting the pool, an accessible route serves the gate or area where participants discharge from the activity.

2. Where spas, cold baths or hot tubs are provided in a cluster, at least 5 percent, but not less than one of each type of spa, cold bath or hot tub in each cluster, shall be accessible and be on an *accessible route*.

3. *Swimming pools*, wading pools, spas, cold baths and hot tubs that are required to be*accessible* by Sections 1111.2.2 and 1111.2.3 are not required to provide *accessible* means of entry into the water.

Committee Reason:

The modification clarified the exception by removing the raised only to instead allow for access to locations where viewers meet with participants. The proposal was approved as this is a common practice for water parks. The committee had some suggestions for public comments. The term catch pool is defined in the ICC A117.1, but it is not defined in the IBC - this needs to be clarified. The ISPSC use the term 'deck' - that would be more consistent terminology than 'area'. (Vote: 14-0)

Final Hearing Results

E144-21	AM

E145-21

Original Proposal

IBC: SECTION 202 (New), E107.2

Proponents: Kyle Parag, Colorado Department of Public Safety, Division of Fire Prevention & Control (Kyle.Parag@state.co.us)

2021 International Building Code

Add new definition as follows:

TACTILE SIGN

.

Building signage in a location where visually impaired person could feasibly read informational elements with the sense of touch.

Revise as follows:

~~**E107.2**~~ **1112.6 Designations.** Where provided, interior and exterior signs identifying permanent rooms and spaces shall be visual characters, raised characters and braille complying with ICC A117.1. Where pictograms are provided as designations of interior rooms and spaces, the pictograms shall have visual characters, raised characters and braille complying with ICC A117.1.

Exceptions:

1. Exterior signs that are not located at the door to the space they serve are not required to comply.
2. Building directories, menus, seat and row designations in assembly areas, occupant names, building addresses and company names and logos are not required to comply.
3. Signs in parking facilities are not required to comply.
4. Temporary (seven days or less) signs are not required to comply.
5. In detention and correctional facilities, signs not located in public areas are not required to comply.

Reason: Section 703.1 of ICC A117.1 uses the term tactile without defining it. Without language from the IBC, Section 703 could be considered non-applicable to voluntarily installed visual only space designation signage. This proposal defines tactile in a manner consistent with the building signage that should contained raised letters and braille.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Administrative correctly to avoid a loophole. This would not require extra signs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

~~TACTILE~~

~~SIGN~~ .

~~Building signage in a location where visually impaired person could feasibly read informational elements with the sense of touch.~~

Committee Reason: The modification removed the proposed definition which was not clear. Moving the requirements for room signage from Appendix E to Chapter 11 is needed for persons with visual impairments. (Vote: 13-0)

Final Hearing Results

E145-21 AM

E147-21

Original Proposal

IBC: E104.2.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

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E104.2 Communication features. *Accessible* communication features shall be provided in accordance with Sections E104.2.1 through E104.2.4.

Revise as follows:

E104.2.1 Transient lodging. In *transient lodging* facilities, dwelling units or *sleeping units* with accessible communication features shall be provided in accordance with Table E104.2.1. Units ~~required to comply with Table E104.2.1~~ with accessible communication features shall be dispersed among the various classes of units. At least one Accessible unit required by Section 1108.6.1.1 shall also provide accessible communication features. Not more than 10 percent of Accessible units required by Section 1108.6.1.1 shall be used to satisfy the minimum number of units required to provide accessible communication features.

TABLE E104.2.1 DWELLING OR SLEEPING UNITS WITH ACCESSIBLE COMMUNICATION FEATURES

TOTAL NUMBER OF DWELLING OR SLEEPING UNITS PROVIDED	MINIMUM REQUIRED NUMBER OF DWELLING OR SLEEPING UNITS WITH ACCESSIBLE COMMUNICATION FEATURES
1	1
2 to 25	2
26 to 50	4
51 to 75	7
76 to 100	9
101 to 150	12
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1,000	5% of total
1,001 and over	50 plus 3 for each 100 over 1,000

Reason: The first paragraph is revised to make the text match the table. The text only talks about sleeping units, but the table talks about dwelling and sleeping units. A hotel can have rooms with kitchen (dwelling units) or room without kitchens (sleeping units).
The 2nd paragraph in this code change is intended to help coordinate the appendix requirements related to Accessible units (i.e. hotel rooms) with communications features to the requirements in the ADA for these types of units. This does not increase the number of units required. It just addresses dispersion of those units.

Coordinates with the ADA requirement (ADA 224.5) limiting the number of units with communications features (rooms for persons with hearing impairments) that may also be constructed as Accessible (rooms for persons who use wheelchairs or scooters) spaces. This ensures better dispersion so that people that only need communication features to accommodate their needs are not kept from having access to the rooms that serve their needs and so that not all communication feature rooms are also constructed to provide mobility access.

To make it easier to see how the proposed language meshes with the ADA, here is the text from the 2010 federal standard which we are trying to coordinate with:**224.5 Dispersion.** Guest rooms required to provide mobility features complying with 806.2 and guest rooms required to provide communication features complying with 806.3 shall be dispersed among the various classes of guest rooms, and shall provide choices of types of guest rooms, number of beds, and other amenities comparable to the choices provided to other guests. Where the minimum number of guest rooms required to comply with 806 is not sufficient to allow for complete dispersion, guest rooms shall be dispersed in the following priority: guest room type, number of beds, and amenities. At least one guest room required to provide mobility features complying with 806.2 shall also provide communication features complying with 806.3. Not more than 10 percent of guest rooms required to provide mobility features complying with 806.2 shall be used to satisfy the minimum number of guest rooms required to provide communication features complying with 806.3.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is already a requirement under the 2010 ADA.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as this coordinates with the 2010 ADA language for dispersion of transient lodging with communication features. (Vote: 14-0)

Final Hearing Results

E147-21	AS

E148-21

Original Proposal

IBC: E105.2, E105.2.1, E105.2.2

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com)

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Revise as follows:

~~E105.2~~ <u>1110.8</u> Laundry equipment. Where provided in spaces required to be*accessible*, washing machines and clothes dryers shall comply with this section.

~~E105.2.1~~<u>1110.8.1</u> Washing machines. Where three or fewer washing machines are provided, one or more shall be*accessible*. Where more than three washing machines are provided, two or more shall be *accessible*.

~~E105.2.2~~<u>1110.8.2</u> Clothes dryers. Where three or fewer clothes dryers are provided, one or more shall be*accessible*. Where more than three clothes dryers are provided, two or more shall be *accessible*.

Reason: This proposal moves scoping for laundry equipment from Appendix E to Chapter 11. This move will only affect public use spaces such as laundromats and common use spaces such as laundry rooms in residential occupancies. It will not affect laundry equipment located in employee only work areas because such spaces are exempted by IBC 1103.2.2. Chapter 11 of the ICC A117.1 scopes all accessible elements within Accessible, Type A, and Type B dwelling or sleeping units, including laundry equipment . It is, however, necessary to scope these criteria in Chapter 11 for public use and common use spaces to avoid costly design errors. Spaces must be designed to accommodate washers and dryers required to be accessible. In particular, the clear floor space must be properly aligned with the fixture. Changes after the fact are costly and can result in non-compliance with the ADA and the Fair Housing Act.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Both the 2010 ADA Standards for Accessible Design and the Fair Housing Act Accessibility Guidelines already require washers and dryers to be accessible. The scoping in Appendix E is consistent with these requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it clarifies what accessibility is required for public or shared laundry facilities by moving this from Appendix E to the code. Laundry in dwelling units is addressed in the ICC A117.1. (Vote: 11-3)

Final Hearing Results

E148-21	AS

E149-21

Original Proposal

IBC: 1109.2.7.3

Proponents: Andrew Cid, BARRIER FREE SOLUTIONS FOR THE DEAF AND HARD OF HEARING, BARRIER FREE SOLUTIONS FOR THE DEAF AND HARD OF HEARING

2021 International Building Code

Revise as follows:

1109.2.7.3 Public address systems. Where stadiums, arenas and *grandstands* have 15,000 fixed seats or more and provide audible public announcements, they shall also provide ~~prerecorded or real-time~~ captions of those audible public announcements, either prerecorded or real time.

Reason: This is a clarification of the requirements for these systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change in construction requirements - this is a clarification of an existing requirement.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it clarifies that captioning applies to both prerecorded and real time information. (Vote: 14-0)

Final Hearing Results

E149-21	AS

FS1-22

Original Proposal

IBC: 1401.1, [BS] 1402.3, 1404.1.1 (New), SECTION 1410 (New), 1410.1 (New), 1410.2 (New), 1410.3 (New), FIGURE 1410.3(1) (New), FIGURE 1410.3.1(2) (New), 1410.4 (New), TABLE 1410.4.2.4 (New), 1410.5 (New), 1410.6 (New), 1410.7 (New), 1410.7.1 (New), 1410.7.2 (New)

Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net); Glenn Overcash, AECOM, Federal Emergency Management Agency (glenn.overcash@aecom.com); Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org); Pataya Scott, Federal Emergency Management Agency (pataya.scott@fema.dhs.gov)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

1401.1 Scope. The provisions of this chapter shall establish the minimum requirements for *exterior walls*; *exterior wall coverings*; *exterior wall* openings; exterior windows and doors; <u>exterior soffits and fascias</u>; and architectural *trim.*

[BS] 1402.3 ~~Structural~~ <u>Wind resistance</u>. *Exterior walls*, <u>exterior wall coverings, exterior soffits, fascias,</u> and the associated openings, shall be designed and constructed to resist safely the superimposed *loads* required by Chapter 16.

Add new text as follows:

<u>**1404.1.1 Soffits and fascias.** Soffits and fascias installed as part of roof overhangs shall comply with Section 1410</u>.

<u>SECTION 1410
SOFFITS AND FASCIAS AT ROOF OVERHANGS</u>

<u>**1410.1 General.** Soffits and fascias at roof overhangs shall be designed and constructed in accordance with the applicable provisions of this section.</u>

<u>**1410.2 General wind requirements.** Soffits and fascias shall be capable of resisting the component and cladding loads for walls determined in accordance with Chapter 16 using an effective wind area of 10 square feet (0.93 m^2).</u>

<u>**1410.3 Vinyl and aluminum soffit panels.** Vinyl and aluminum soffit panels shall comply with Section 1410.2 and shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure 1410.3.1(1). Where the unsupported span of soffit panels is greater than 12 inches (406 mm) where the design wind pressure is greater than 30 psf or greater than 16 inches where the wind pressure is 30 psf or less, intermediate nailing strips shall be provided in accordance with Figure 1410.3.1(2). Vinyl and aluminum soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.</u>

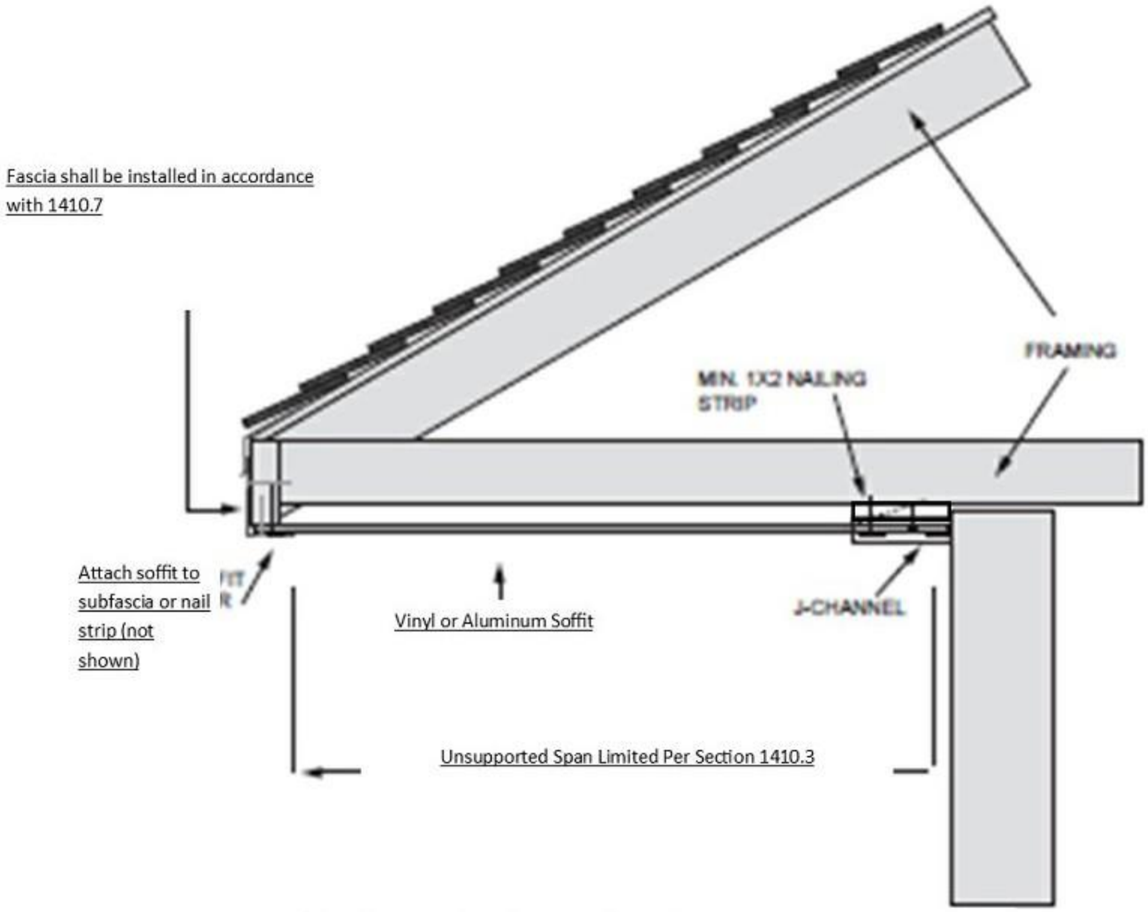


FIGURE 1410.3(1) SINGLE-SPAN VINYL OR ALUMINUM SOFFIT PANEL SUPPORT

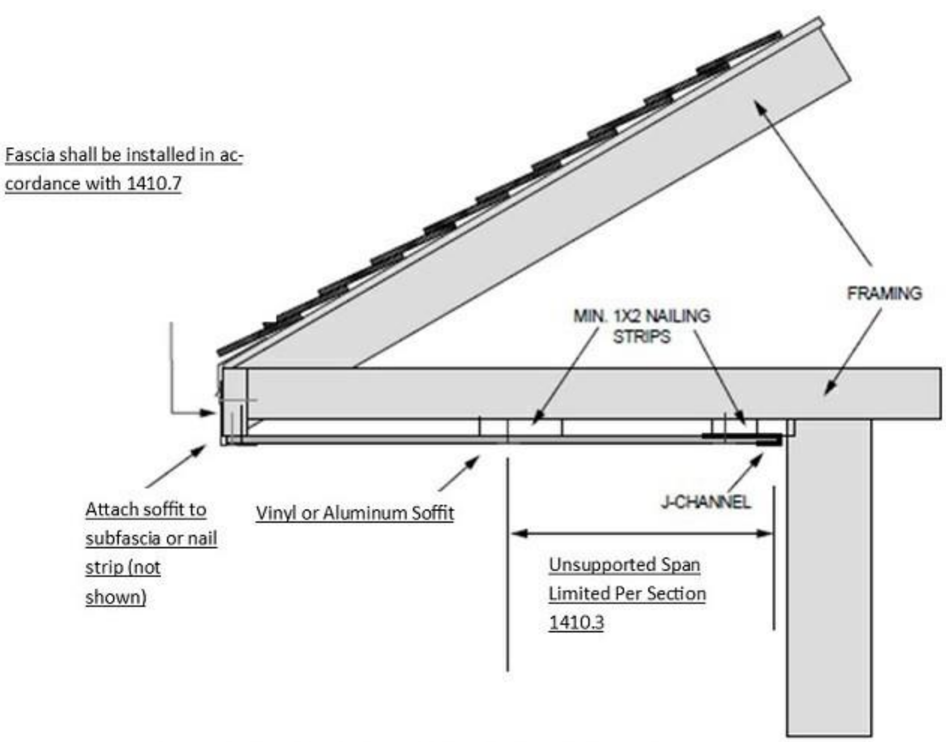


FIGURE 1410.3.1(2) DOUBLE-SPAN VINYL OR ALUMINU SOFFIT PANEL SUPPORT

1410.4 Fiber-cement soffit panels. Fiber-cement soffit panels shall comply with Section 1410.2 and shall be a minimum of 1/4 inch (6.4 mm) in thickness and comply with the requirements of ASTM C1186, Type A, minimum Grade II, or ISO 8336, Category A, minimum Class 2. Panel joints shall occur over framing or over wood structural panel sheathing. Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modifiedround head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.

TABLE 1410.4.2.4 PRESCRIPTIVE ALTERNATE FOR WOOD STRUCTURAL PANEL SOFFIT[b, c, d, e]

Maximum Design Pressure (+ or - psf)	Minimum Panel Span Rating	Minimum Panel Performance Category	Nail Type and Size	Fastenera Spacing Along Edges and Intermediate Supports	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	6f	4
40	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	6	4
50	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	4	4
			8d common (21/2 x 0.131 x 0.281 head diameter	6	6
60	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter	4	3
			8d common (21/2 x 0.131 x 0.281 head diameter	6	4
70	24/16	7/16	8d common (21/2 x 0.131 x 0.281 head diameter	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
80	24/16	7/16	8d common (21/2 x 0.131 x 0.281 head diameter	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
90	32/16	15/32	8d common (21/2 x 0.131 x 0.281 head diameter	4	3
			10d box (3 x 0.128 x 0.312 head diameter)	6	4

a. Fasteners shall comply with Section 1410.6.

b. Maximum spacing of soffit framing members shall not exceed 24 inches.

c. Wood structural panels shall be of an exterior exposure grade.

d. Wood structural panels shall be installed with strength axis perpendicular to supports with a minimum of two continuous spans.

e. Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.42. Framing members shall be minimum 2x3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

f. Spacing at intermediate supports is permitted to be 12 inches on center.

1410.5 Hardboard soffit panels. Hardboard soffit panels shall comply with Section 1410.2 and shall be not less than 7/16 inch (11.11 mm) in thickness and fastened to framing or nailing strips to meet the required design wind pressures. Where the design wind pressure is 30 and less, hardboard soffit panels are permitted to be attached to wood framing with 2 1/2-inch by 0.113-inch (64 mm by 2.9 mm) siding nails spaced not more than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.

1410.6 Wood structural panel soffit. Wood structural panel soffits shall comply with Section 1410.2 and shall have minimum panel performance category of 3/8. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire. Alternatively, wood structural panel soffits are permitted to attached to wood framing in accordance with Table 1410.6.

1410.7 Aluminum Fascia. Aluminum fascia shall comply with Section 1410.2 and shall be a minimum of 0.019 inches and installed in accordance with manufacturer's installation instructions. Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or other approved corrosion-resistant fasteners. Aluminum fascia shall be attached to wood frame construction in accordance with Section 1410.7.1 or 1410.7.2.

1410.7.1 Fascia installation where the design wind pressure is 30 psf or less. Where the design wind pressure is 30 pounds per square foot (1.44kPA) or less, aluminum fascia shall be a attached with one finish nail (1 ¼ x 0.057 x 0.177 head diameter) in the return leg spaced a maximum of 24 inches (610 mm) on center, and the fascia shall be inserted under the drip edge with at least 1 inch (305 mm) of fascia material covered by the drip edge. Where the fascia can not be inserted under the drip edge, the top edge of the fascia shall be secured using one finish nail (1 ¼ x 0.057 x 0.177 head diameter) located not more than 1 inch below the drip edge and spaced a maximum of 24 inches on center.

1410.7.2 Fascia installation where the design wind pressure exceeds 30 psf. Where the design wind pressure is greater than 30 pounds per square foot (1.44kPA), aluminum fascia shall be attached with one finish nail (1 ¼ x 0.057 x 0.177 head diameter) in the return leg spaced a maximum of 16 inches on center and one finish nail located no more than 1 inch below the drip edge spaced a maximum of 16 inches on center. As an alternative, the top edge of the fascia is permitted to be secured using utility trim installed beneath the drip edge with snap locks punched into the fascia spaced no more than 6 inches on center.

Reason: The purpose of this code change proposal is to improve the wind performance of soffits and fascia by adding structural design requirements and compliant installation options to the International Building Code (IBC). As part of the response to Hurricane Michael in Florida, the Federal Emergency Management Agency (FEMA) deployed a Mitigation Assessment Teams (MAT) composed of national and regional building science experts who assess building performance after a disaster. These experts then incorporate lessons learned to make recommendations on improving the resilience of new construction and repairs and retrofits of existing buildings.
The following MAT-related conclusion, recommendation and supporting observations are included in FEMA P-2077, Hurricane Michael in Florida MAT Report (https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-michael_florida.pdf). **The Hurricane Michael in Florida MAT concluded (see FL-23) that "buildings throughout the impacted area were found to be vulnerable to wind-driven rain and water infiltration."** The MAT observed wind-driven rain and water infiltration at many buildings. These vulnerabilities can lead to extensive damage and disruption of normal building operations. The MAT Report also recommended (see FL-23d) that "**designers, contractors, and inspectors should place more emphasis on proper soffit installation**" and "**should adapt the guidance in Hurricane Irma in Florida Recovery Advisory 2**, *Soffit Installation in Florida* (in FEMA P-2023, 2018g), **Hurricane Michael in Florida Recovery Advisory 2**, *Best Practices for Minimizing Wind and Water Infiltration Damage* (in FEMA P-2077, 2019a), **and Technical Fact Sheet 7.5**, "Minimizing Water Intrusion through Roof Vents in High-Wind Regions" (in FEMA P-499, 2010f) **to non-residential applications to help prevent soffit blow-off**."

Observations of non-residential soffit failure that led to water infiltration include the University of Florida Institute of Food and Agricultural Sciences Bay County Extension Building (Panama City, FL) shown below (MAT Report Figure 5-16). Several vinyl soffit panels were also blown away from the wood frame roof overhang, thereby exposing the attic space to entrance of wind-driven rain. Interior water intrusion was exacerbated by loss of roof top equipment and leakage at hip closures which led to collapse of the gypsum ceiling.

Another non-residential soffit failure at roof overhang is documented at the Bay County Courthouse addition (MAT Report Figure 5-110, shown below) where repairs to interior damages caused by the soffit breach, roof membrane damage, and flashing deficiencies at the ridge and hips were estimated to cost $477,000.

In addition the Vinyl Siding Institute has noted in several analysis reports from Hurricanes over the past several years, including Irma and Isaias that this an issue that needs to be addressed due to failures in the field.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides some clarity on the required wind loads and material specifications for soffits. The code change proposal may decrease costs for wood structural panel soffits because it provides some prescriptive solutions as an alternative to design.

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Modification:

1410.3 Vinyl and aluminum soffit panels. Vinyl and aluminum soffit panels shall comply with Section 1410.2 and shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure 1410.3.1(1). Where the unsupported span of soffit panels is greater than 12 inches (406 mm) where the design wind pressure is greater than 30 psf or greater than 16 inches where the wind pressure is 30 psf or less, intermediate nailing strips shall be provided in accordance with Figure 1410.3.1(2). Vinyl and aluminum soffit panels shall be installed in accordance with the manufacturer's installation instructions. ~~Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.~~

1410.4 Fiber-cement soffit panels. Fiber-cement soffit panels shall comply with Section 1410.2 and shall be a minimum of 1/4 inch (6.4 mm) in thickness and comply with the requirements of ASTM C1186, Type A, minimum Grade II, or ISO 8336, Category A, minimum Class 2. Panel joints shall occur over framing or over wood structural panel sheathing. Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions. ~~Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.~~

1410.5 Hardboard soffit panels. Hardboard soffit panels shall comply with Section 1410.2 and shall be not less than 7/16 inch (11.11 mm) in thickness and fastened to framing or nailing strips to meet the required design wind pressures. Where the design wind pressure is 30<u>pounds per square foot (1.44 kPa)</u> and less, hardboard soffit panels are permitted to be attached to wood framing with 2 1/2-inch by 0.113-inch (64 mm by 2.9 mm) siding nails spaced not more than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports. <u>Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions.</u> ~~Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire.~~

1410.6 Wood structural panel soffit. Wood structural panel soffits shall comply with Section 1410.2 and shall have minimum panel performance category of 3/8. ~~Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or staples or other approved corrosion-resistant fasteners. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples, where permitted, shall have a minimum crown width of 7/16 inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire. Alternatively, w~~ <u>W</u>ood structural panel soffits are permitted to<u>be</u> attached to wood framing in accordance with Table 1410.6.

1410.7 Aluminum Fascia. Aluminum fascia shall comply with Section 1410.2 and shall be a minimum of 0.019 inches and installed in accordance with manufacturer's installation instructions. ~~Fasteners shall be aluminum, galvanized, stainless steel or rust preventative coated nails or other approved corrosion-resistant fasteners.~~ Aluminum fascia shall be attached to wood frame construction in accordance with Section 1410.7.1 or 1410.7.2.

Committee Reason: Approved as modified as this proposal adds necessary criteria for soffits and facias to the code. The committee noted that a rewording of section 1410.2 could be considered as a Public Comment to modify 'shall be capable of resisting' to possibly 'shall be designed to resist'. The modifications add clarity to the intent. (Vote: 14-0)

Final Hearing Results

FS1-22 AM

FS2-22

Original Proposal

IBC: [BS] 1402.3.1 (New)

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new text as follows:

[BS] 1402.3.1 Veneer attachment. *Veneers* shall be attached as specified in Section 1404. For*veneers* not specified in Section 1404, attachments and associated support systems shall be designed as specified in Chapter 16 and installed in accordance with manufacturer's instructions.

Reason: New claddings that do not directly fit into the wall covering materials currently specified in the code are being introduced to the market. Some of these new claddings are rainscreen systems which provide drainage and ventilation functionality in addition to other cladding functions. The attachment of such claddings need to be designed to resist loads and maintain their performance safely. This proposal provides the "roadmap" to the code requirements for the design of the attachment of these claddings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add new requirements to the code. Rather, it highlights the the appropriate compliance requirements already in the code for materials that are not directly specified in the code. Therefore, it does not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Disapproved as the committee felt the change was unnecessary and that the referenced section 1404 does not cover all veneer options. The committee expressed concerns that the terms used in the proposal may not be consistent with the terms used throughout the industry(Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

[BF] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of *exterior walls* for the purpose of providing a weather-resisting barrier, insulation or for aesthetics, including but not limited to, *veneers*, siding, *exterior insulation and finish systems*, <u>*rainscreen systems*</u>, architectural trim and embellishments such as *cornices*, soffits, facias, gutters and leaders.

[BS] 1402.3 Structural. *Exterior walls*, and the associated openings, shall be designed and constructed to resist safely the superimposed *loads* required by Chapter 16.

[BS] ~~**1402.3.1 Veneer attachment.** *Veneers* shall be attached as specified in Section 1404. For *veneers* not specified in Section 1404, attachments and associated support systems shall be designed as specified in Chapter 16 and installed in accordance with manufacturer's instructions.~~

~~**1403.14**~~ <u>**1402.3.1**</u> **Attachments through** <u>**exterior**</u> **insulation.** <u>Where *exterior wall coverings* are attached to the building structure through exterior continuous insulation, furring and attachments through the exterior insulation shall be designed to resist design *loads* determined in accordance with Chapter 16, including support of cladding weight as applicable.</u> *Exterior wall coverings* attached to the building structure through foam plastic insulating sheathing shall comply with the attachment requirements of Section 2603.11, 2603.12, or 2603.13.

Commenter's Reason: The modification in this proposal responds to the committee's reason for disapproval as well as issues raised during the discussion of the proposal during the Committee Action Hearing. It does this while continuing to address the issues addressed by the original proposal. The proposal sought to clarify to provisions for attachment of cladding (*exterior wall covering*) systems to be designed to resist loads and maintain their performance safely. This clarity was needed as new technology and types of cladding systems, for example rainscreen systems, that are not specified in Section 1404 are becoming more prevalent in the market.
Specifically the modification addresses:

1) The correctness and consistency of terminology: There was inconsistency noted between the terms cladding, *veneer* and *exterior wall covering*. This is addressed by using the consistent term exterior wall covering. To clarify that rainscreen systems are included as *exterior wall coverings*, they were added to the example list within the *exterior wall covering* definition.

2) Clarity of requirements for exterior wall covering attachment: This was done by moving the existing section 1403.14 "Attachment through insulation" from the **Materials Section** to be included under the **1402.3 Structural**. This section is also enlarged to cover all types of exterior continuous insulation rather than only foam plastic insulating sheathing.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This public comment / proposal does not add new requirements to the code. Rather is reorganizes and adds clarifying language to existing sections.

Final Hearing Results

FS2-22	AMPC1

FS3-22

Original Proposal

IBC: [BS] 1404.6, [BS] 1404.6.1, [BS] 1404.6.2, [BS] 1404.10

Proponents: Phillip Samblanet, The Masonry Society, The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, National Concrete Masonry Association, Masonry Alliance for Codes and Standards (jthompson@ncma.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.6 Anchored masonry veneer. *Anchored masonry veneer* shall comply with the provisions of Sections 1404.6 through 1404.9 and Sections ~~12.1~~13.1 and ~~12.2~~13.2 of TMS 402.

[BS] 1404.6.1 Tolerances. *Anchored masonry veneers* in accordance with Chapter 14 are not required to meet the tolerances in Article 3.3 ~~F1G~~ of TMS 602.

Delete without substitution:

~~**[BS] 1404.6.2 Seismic requirements.** *Anchored masonry veneer* located in *Seismic Design Category* C, D, E or F shall conform to the requirements of Section 12.2.2.11 of TMS 402.~~

Revise as follows:

[BS] 1404.10 Adhered masonry veneer. *Adhered masonry veneer* shall comply with the applicable requirements in this section and Sections ~~12.1~~13.1 and ~~12.3~~13.2 of TMS 402.

Reason: Chapter 12 (Veneer) in TMS 402-16 was moved to Chapter 13 in TMS 402-22. Similarly, the tolerances in TMS 602 were relocated. The changes proposed here reflect those revisions.
In addition, the basis for the Veneer provisions in TMS 402 were modified to be more rationally based. Seismic design requirements are now integrally incorporated into the veneer provisions of TMS 402. As such, IBC Section 1404.6.2 is not needed any longer as these seismic requirements are adopted by the general reference in IBC Section 1404.6.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply updates section references. As such, there is no impact on construction costs.

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Modification:
[BS]1404.6.1 Tolerances. *Anchored masonry veneers* in accordance with Chapter 14 are not required to meet the tolerances in Article 3.3G.1 of TMS 602.

Committee Reason: Approved as modified as the proposal appropriately updates the reference to TMS402-22. The modification clarifies the reference. (Vote: 14-0)

Final Hearing Results	
FS3-22	AM

FS4-22

Original Proposal

IBC: [BS] 1404.14

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.14 Vinyl siding and Insulated Vinyl Siding. *Vinyl siding* and *insulated vinyl siding* conforming to the requirements of this section and complying with ASTM D3679 and ASTM D7793, respectively, shall be permitted on *exterior walls* where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m^2). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m^2), tests or calculations indicating compliance with Chapter 16 shall be submitted. Vinyl siding and insulated vinyl siding shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.

Reason: This change compliments FS134 which was been fully approved last year by the IBC fire safety committee, the introduction of ASTM D7793 and insulated vinyl siding into the IBC. The installation of vinyl siding and insulated vinyl siding are identical relative to code requirements. This proposal brings in a simple change to require insulated vinyl siding to be installed in the same manner as vinyl siding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change adds in installation requirements for when the product is specified without any technical changes.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted per the provided reason statement. (Vote: 14-0)

Final Hearing Results

FS4-22	AS

FS5-22

Original Proposal

IBC: [BS] 1404.14
Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D3679 shall be permitted on *exterior walls* where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m^2). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m^2), tests or calculations indicating compliance with Chapter 16 shall be submitted. ~~Vinyl siding shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.~~

Reason: This sentence is not necessary as it is redundant to specific provisions already provided including in this sections as well as the broader code and definition for exterior wall covering.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a cleanup change.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as this cleans up the code language. (Vote: 14-0)

Final Hearing Results

FS5-22	AS

FS7-22

Original Proposal

IBC: 1404.14.2 (New), TABLE 1404.14.2 (New)

Proponents: THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new text as follows:

1404.14.2 Installation over foam plastic insulating sheathing. Where vinyl siding or insulated vinyl siding is installed over foam plastic insulating sheathing, the vinyl siding shall comply with Section 1404.14 and shall have a wind load design pressure rating in accordance with Table 1404.14.2.

Exceptions:

1. Where the foam plastic insulating sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Section 1404.14.1.
2. Where the vinyl siding manufacturer's product specifications provide an approved wind load design pressure rating for installation over foam plastic insulating sheathing, use of this wind load design pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.
3. Where the foam plastic insulating sheathing and its attachment has a design wind pressure resistance complying with Sections 2603.10 and 1609, the vinyl siding shall be installed in accordance with Section 1404.14.1.

TABLE 1404.14.2 REQUIRED MINIMUM WIND LOAD DESIGN PRESSURE RATING FOR VINYL SIDING INSTALLED OVER FOAM PLASTIC SHEATHING ALONE

ULTIMATE DESIGN WIND SPEED (MPH)	ADJUSTED MINIMUM DESIGN WIND PRESSURE (ASD) (PSF)[a, b]					
	Case 1: With interior gypsum wallboard[c]			Case 2: Without interior gypsum wallboard[c]		
	Exposure			Exposure		
	B	C	D	B	C	D
≤ 95	-30.0	-33.2	-39.4	-33.9	-47.4	-56.2
100	-30.0	-36.8	-43.6	-37.2	-52.5	-62.2
105	-30.0	-40.5	-48.1	-41.4	-57.9	-68.6
110	-31.8	-44.5	-52.8	-45.4	-63.5	-75.3
115	-35.5	-49.7	-59.0	-50.7	-71.0	-84.2
120	-37.4	-52.4	-62.1	-53.4	-74.8	-88.6
130	-44.9	-62.8	-74.5	-64.1	-89.7	-106
> 130	See Note d					

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m , 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation is permitted.

b. The table values are based on a maximum 30-foot mean roof height, and effective wind area of 10 square feet Wall Zone 5 (corner), and the
ASD design component and cladding wind pressure determined in accordance with Section 1609 multiplied by the following adjustment
factors: 1.87 (Case 1) and 2.67 (Case 2).

c. Gypsum wallboard, gypsum panel product or equivalent.

d. For the indicated wind speed condition and where foam sheathing is the only sheathing on the exterior of a frame wall with vinyl siding, the
wall assembly shall be capable of resisting an impact without puncture at least equivalent to that of a wood frame wall with minimum 7/16 -inch
OSB sheathing as tested in accordance with ASTM E1886. The vinyl siding shall comply with an adjusted design wind pressure requirement in accordance with Note b, using an adjustment factor of 2.67.

Reason: This proposal coordinates the IBC with provisions already in the IRC (Section R703.11.2) and in ASTM D3679 for specification of vinyl siding. These provisions are supported by collaborative research including wind pressure testing of assemblies and full-scale wind tunnel tests of whole buildings with various combinations of vinyl siding and foam sheathing (see Bibliography). For buildings meeting criteria for Type V construction (where vinyl siding is permissible in the IBC), this proposal provides needed wind load pressure rating requirements for vinyl siding installed on walls that also use foam sheathing as continuous insulation for energy code compliance.

Bibliography: Please refer to the following reports and presentation for technical substantiation of the proposal (and the current identical provisions in the 2015-2021 editions of the IRC):
1. https://ibhs.org/wp-content/uploads/wpmembers/files/Wind-Loads-Multi-Layer-Wall-Systems-Air-Permeable-Exterior-Cladding_IBHS.pdf (full-scale wind tunnel study; ACI/SEI paper by IBHS, ACC, VSI, and NAHB Research Center)

2. https://www.nrel.gov/docs/fy13osti/55204.pdf (DOE Building America report on tests by NAHB Research Center)

3. https://www.energy.gov/sites/prod/files/2013/12/f6/wind_pressure_perf.pdf (presentation of DOE research and testing project results)

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase cost for use of vinyl siding on Type V buildings by requiring use of a higher wind pressure rated vinyl siding when applied over foam sheathing. However, there is no cost increase for the common condition where foam sheathing is installed over a separate sheathing material (e.g., wood structural panel, gypsum sheathing, etc.) separately capable of resting the full design wind load (see Exception 1).

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1404.14.2 Installation over foam plastic insulating sheathing. Where vinyl siding or insulated vinyl siding is installed over foam plastic insulating sheathing, the vinyl siding or insulated vinyl siding shall comply with Section 1404.14 and shall have a wind load design pressure rating in accordance with Table 1404.14.2.
Exceptions:

1. Where the foam plastic insulating sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other approved backing capable of independently resisting the design wind pressure, the vinyl siding or insulated vinyl siding shall be installed in accordance with Section 1404.14.1.

2. Where the vinyl siding or insulated vinyl siding manufacturer's product specifications provide an approved wind load design pressure rating for installation over foam plastic insulating sheathing, use of this wind load design pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.
3. Where the foam plastic insulating sheathing and its attachment has a design wind pressure resistance complying with Sections 2603.10 and 1609, the vinyl siding or insulated vinyl siding shall be installed in accordance with Section 1404.14.1.

Committee Reason: Approved as modified as this proposal coordinates the IBC with the provisions in the IRC. The modification updates the terminology consistent with previous committee actions. (Vote: 14-0)

Final Hearing Results

FS7-22	AM

FS8-21

Original Proposal

IBC: 704.1, 704.1.1 (New)

Proponents: Matthew Hunter, American Wood Council, American Wood Council (mhunter@awc.org)

2021 International Building Code

Revise as follows:

704.1 Requirements. The *fire-resistance ratings* of structural members and assemblies shall comply with this section and the requirements for the type of construction as specified in Table 601. ~~The *fire-resistance ratings* shall be not less than the ratings required for the fire-resistance-rated assemblies supported by the structural members.~~

> ~~**Exception:** *Fire barriers*, *fire partitions*, *smoke barriers* and *horizontal assemblies* as provided in Sections 707.5, 708.4, 709.4 and 711.2, respectively.~~

Add new text as follows:

704.1.1 Supporting construction. The *fire-resistance* ratings of supporting structural members and assemblies shall be not less than the ratings required for the fire-resistance-rated assemblies supported by the structural members.

> **Exception:** Structural members and assemblies that support fire barriers, fire partitions, smoke barriers and horizontal assemblies as provided in Sections 707.5, 708.4, 709.4 and 711.2, respectively.

Reason: This is an editorial clean-up to better describe the intent of the exception. There is no technical change. The current exception does not exempt fire barriers, fire partitions, smoke barriers and horizontal assemblies from requirements for type of construction, only the provision about supporting construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The purpose of this code change is editorial in nature and is only proposed to clarify the intent of the Exception.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that this proposal is editorial and clarifies the language of the section. (Vote: 9-3)

Final Hearing Results

FS8-21	AS

FS8-22

Original Proposal

IBC: [BS] 1404.17, [BS] 2603.11, [BS] 2603.12, [BS] 2603.12.1, TABLE 2603.12.1, [BS] 2603.12.2, TABLE 2603.12.2, [BS] 2603.13, [BS] 2603.13.1, TABLE 2603.13.1, [BS] 2603.13.2, TABLE 2603.13.2

Proponents: Rob Brooks, Rob Brooks and Associates LLC, DuPont (rob@rtbrooks.com)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.17 Fastening. Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other *approved* corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.2 or the*approved* manufacturer's instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with *approved* mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of *wood structural panels* as specified in Table 2308.6.3(3). Fastening of claddings or furring through foam plastic insulating sheathing shall comply with Section 1404.17.1, 1404.17.2, or 1404.17.3 as applicable.

[BS] ~~2603.11~~ 1404.17.1 Cladding attachment over foam sheathing to masonry or concrete wall construction. Cladding shall be specified and installed in accordance with this Chapter ~~14~~ and the cladding manufacturer's installation instructions or an approved design. Foam sheathing shall be attached to masonry or concrete construction in accordance with the insulation manufacturer's installation instructions or an approved design. Furring and furring attachments through foam sheathing shall be designed to resist design *loads* determined in accordance with Chapter 16, including support of cladding weight as applicable. Fasteners used to attach cladding or furring through foam sheathing to masonry or concrete substrates shall be approved for application into masonry or concrete material and shall be installed in accordance with the fastener manufacturer's installation instructions.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing and connection to a masonry or concrete substrate, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section 1407.
3. For anchored masonry or stone *veneer* installed over foam sheathing, refer to Section 1404.

[BS] ~~2603.12~~ 1404.17.2 Cladding attachment over foam sheathing to cold-formed steel framing. Cladding shall be specified and installed in accordance with this Chapter ~~14~~ and the cladding manufacturer's approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. Where used, furring and furring attachments shall be designed to resist design *loads* determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to cold-formed steel framing shall meet or exceed the minimum fastening requirements of Sections 1404.17.2.1 ~~2603.12.1~~ and1404.17.2.2 ~~2603.12.2~~, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section 1407.
3. For anchored masonry or stone *veneer* installed over foam sheathing, refer to Section 1404.

[BS] ~~2603.12.1~~ 1404.17.2.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.12.1~~ 1404.17.2.1.

TABLE ~~2603.12.1~~ 1404.17.2.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE[b]	CLADDING FASTENER VERTICAL SPACING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[c] (inches)							
			16″ o.c. fastener horizontal spacing				24″ o.c. fastener horizontal spacing			
			Cladding weight				Cladding weight			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Cold-formed steel framing (minimum penetration of steel thickness plus 3 threads)	#8 screw into 33 mil steel or thicker	6	3.00	2.95	2.20	1.45	3.00	2.35	1.25	DR
		8	3.00	2.55	1.60	0.60	3.00	1.80	DR	DR
		12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
	#10 screw into 33 mil steel	6	4.00	3.50	2.70	1.95	4.00	2.90	1.70	0.55
		8	4.00	3.10	2.05	1.00	4.00	2.25	0.70	DR
		12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
	#10 screw into 43 mil steel or thicker	6	4.00	4.00	4.00	3.60	4.00	4.00	3.45	2.70
		8	4.00	4.00	3.70	3.00	4.00	3.85	2.80	1.80
		12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = design required, o.c. = on center.

a. Cold-formed steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.

b. Screws shall comply with the requirements of AISI S240.

c. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C587 or ASTM C1289.

[BS] ~~2603.12.2~~ 1404.17.2.2 Furred cladding attachment. Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.12.2~~ 1404.17.2.2. Where placed horizontally, wood furring shall be *preservative-treated wood* in accordance with Section 2303.1.9 or *naturally durable wood* and fasteners shall be corrosion resistant in accordance Section 2304.10.6. Steel furring shall have a minimum G60 galvanized coating.

TABLE ~~2603.12.2~~ 1404.17.2.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE[b]	MINIMUM PENETRATION INTO WALL FRAMING (inches)	FASTENER SPACING IN FURRING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[d] (inches)							
					16″ o.c. furring[e]				24″ o.c. furring[e]			
					Cladding weight				Cladding weight			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 33 mil steel furring or minimum 1x wood furring[c]	33 mil cold-formed steel stud	#8 screw	Steel thickness plus 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
				16	3.85	1.45	DR	DR	3.40	DR	DR	DR
				24	3.40	DR	DR	DR	2.70	DR	DR	DR
	43 mil or thicker cold-formed steel stud	#8 Screw	Steel thickness plus 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR
				16	4.00	3.30	1.95	0.60	4.00	2.25	DR	DR
				24	4.00	2.25	DR	DR	4.00	0.65	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood furring shall be spruce-pine-fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33 ksi steel. Coldformed steel studs shall be minimum 33 ksi steel for 33 mil and 43 mil thickness and 50 ksi steel for 54 mil steel or thicker.

b. Screws shall comply with the requirements of AISI S240.

c. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.

d. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C587 or ASTM C1289.

e. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

[BS] ~~2603.13~~ 1404.17.3 Cladding attachment over foam sheathing to wood framing. Cladding shall be specified and installed in accordance with this Chapter ~~14~~ and the cladding manufacturer's installation instructions. Where used, furring and furring attachments shall be designed to resist design *loads* determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section ~~2603.13.1~~ 1404.17.3.1 or ~~2603.13.2~~ 1404.17.3.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section 1407.
3. For anchored masonry or stone *veneer* installed over foam sheathing, refer to Section 1404.

[BS] ~~2603.13.1~~ 1404.17.3.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.13.1~~ 1404.17.3.1.

TABLE ~~2603.13.1~~ 1404.17.3.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE[b]	CLADDING FASTENER VERTICAL SPACING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[c] (INCHES)							
			16″ o.c. fastener horizontal spacing				24″ o.c. fastener horizontal spacing			
			Cladding weight:				Cladding weight:			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Wood Framing (minimum $1^1/_4$- inch penetration)	0.113" diameter nail	6	2.00	1.45	0.75	DR	2.00	0.85	DR	DR
		8	2.00	1.00	DR	DR	2.00	0.55	DR	DR
		12	2.00	0.55	DR	DR	1.85	DR	DR	DR
	0.120" diameter nail	6	3.00	1.70	0.90	0.55	3.00	1.05	0.50	DR
		8	3.00	1.20	0.60	DR	3.00	0.70	DR	DR
		12	3.00	0.70	DR	DR	2.15	DR	DR	DR
	0.131" diameter nail	6	4.00	2.15	1.20	0.75	4.00	1.35	0.70	DR
		8	4.00	1.55	0.80	DR	4.00	0.90	DR	DR
		12	4.00	0.90	DR	DR	2.70	0.50	DR	DR
	0.162" diameter nail	6	4.00	3.55	2.05	1.40	4.00	2.25	1.25	0.80
		8	4.00	2.55	1.45	0.95	4.00	1.60	0.85	0.50
		12	4.00	1.60	0.85	0.50	4.00	0.95	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.

DR = Design Required, o.c. = on center.

a. Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

[BS] ~~2603.13.2~~ 1404.17.3.2 Furred cladding attachment. Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table ~~2603.13.2~~ 1404.17.3.2. Where placed horizontally, wood furring shall be *preservative-treated wood* in accordance with Section 2303.1.9 or *naturally durable wood* and fasteners shall be corrosion resistant in accordance with Section 2304.10.6 .

TABLE ~~2603.13.2~~ 1404.17.3.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (INCHES)	FASTENER SPACING IN FURRING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[d] (INCHES)							
					16″ o.c. furring[e]				24″ o.c. furring[e]			
					Siding weight:				Siding weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 1x Wood Furring[c]	Minimum 2x Wood Stud	0.131" diameter nail	$1^1/_4$	8	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162" diameter nail	$1^1/_4$	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No. 10 wood screw	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		$^1/_4$" lag screw	$1^1/_2$	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood framing and furring shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.

d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

e. Furring shall be spaced not greater than 24 inches on center in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

Reason: Fastening of cladding through foam sheathing is currently specified in Chapter 26, but it is optimally located in the cladding attachment provisions of Chapter 14. This proposal relocates the foam sheathing cladding attachment tables from Chapter 26 to Chapter 14. The following list provides the section number revisions:

2603.11 becomes 1404.17.1

2603.12 becomes 1404.17.2

2603.12.1 becomes 1404.17.2.1

2603.12.2 becomes 1404.17.2.2

2603.13 becomes 1404.17.3

2603.13.1 becomes 1404.17.3.1

2603.13.2 becomes 1404.17.3.2

No technical revisions are provided other than section number revisions and editorial reference to "this Chapter" instead of "Chapter 14".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply relocating text from Chapter 26 to Chapter 14 and will not increase nor decrease cost.

Public Hearing Results

Committee Action **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Disapproved by request of proponent to further clarify fastening requirements during the public comment phase. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Jay Crandell, ABTG / ARES Consulting, P.E., ABTG / ARES Consulting (jcrandell@aresconsulting.biz) requests As Submitted

Commenter's Reason: The proponent requested disapproval of FS8 to allow coordination with proposal FS9 which was simply relocating this section of code (1404.17) dealing with general fastening requirements for Section 1404. The proponent of FS9 also requested disapproval because it was discovered in the review process and at the hearings that Section 1404.17 was an "orphaned" section from prior legacy codes and was not up-to-date with terminology and content of the current IBC Section 1404. It was decided to request disapproval (and the committee agreed) on both of these proposal to allow Proposal FS9 to be modified to bring existing Section 1404.17 Fastening up to date and properly locate (move) it to Section 1404.5 ahead of specific cladding/veneer types which address specific fastening requirements relevant to specific types of cladding/veneer (just as done in Section R703 of the IRC for fastening of claddings). Refer to a PC on FS9 that updates and moves the outdated legacy Section 1404.17.
Therefore, in coordination with the above-mentioned PC on FS9, this PC on FS8 requests "approval as submitted" since it is merely adding reference to existing general fastening requirements for attachment of various cladding/veneer and furring through foam sheathing materials. These cladding attachment provisions currently exist in Chapter 26 of the code, but are more relevant to provisions in Chapter 14, specifically the content of Section 1404.17 Fastening.

With the above explanation, I urge your support for this PC on FS8 and the related PC on FS9 so that Section 1404.17 is no longer an "orphan" legacy provision and is brought up-to-date with current content of the IBC.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The PC does not change any requirements and addresses only a code formatting issue dealing with proper location and organization of requirements.

Final Hearing Results

FS8-22	AS

FS9-21

Original Proposal

IBC: 704.2, 704.3, 704.4, 704.4.1, 704.4.2

Proponents: Shane Nilles, City of Cheney, WA, WABO (snilles@cityofcheney.org); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

704.2 ~~Column protection.~~ ~~Where columns are required to have protection to achieve a *fire-resistance rating*, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column height, including connections to other structural members, with materials having the required *fire-resistance rating*. Where the column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.~~

~~**Exception:** Columns that meet the limitations of Section 704.4.1~~.

704.2 ~~704.3~~ Protection of the primary structural frame ~~other than columns~~. Members of the *primary structural frame* ~~other than columns~~ that are required to have protection to achieve a *fire-resistance rating* ~~and support more than two floors or one floor and roof, or support a *load-bearing wall* or a *nonload-bearing wall* more than two *stories* high,~~ shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required *fire-resistance rating*.

~~Exception~~ Exceptions: ~~Individual encasement protection on all sides shall be permitted on all exposed sides provided that the extent of protection is in accordance with the required *fire-resistance rating*, as determined in Section 703~~.

1. Individual encasement protection is permitted to be interrupted where the primary structural member is in direct contact with another structural member.
2. Primary structural members other than columns that do not support more than two floors or one floor and roof, or a load-bearing wall or a nonload-bearing wall more than two stories high, are permitted to be protected by the membrane of a fire-resistance rated wall or horizontal assembly.
3. Members that are integral elements in walls of light-frame construction, including studs, columns, and boundary elements located entirely between the top and bottom plates or tracks, shall be permitted to be protected by the membrane of a fire-resistance rated wall assembly.

~~704.4~~ 704.3 Protection of secondary structural members. *Secondary structural members* that are required to have protection to achieve a *fire-resistance rating* shall be protected by individual encasement protection, by the membrane of a fire-resistance rated wall or horizontal assembly, or a combination of both.

~~**704.4.1 Light-frame construction.** Studs, columns and boundary elements that are integral elements in *walls* of *light-frame construction* and are located entirely between the top and bottom plates or tracks shall be permitted to have required *fire-resistance ratings* provided by the membrane protection provided for the *wall*.~~

~~**704.4.2 Horizontal assemblies.** *Horizontal assemblies* are permitted to be protected with a membrane or ceiling where the membrane or ceiling provides the required *fire-resistance rating* and is installed in accordance with Section 711~~.

Reason: The current language is confusing and misleading. It does not follow regular code language structure that provides charging language, and exceptions thereto. It further divides the primary structural elements into two separate sections, columns and those other than columns, and it also mixes some secondary member language in with the primary structure section. This proposal restructures and consolidates into two sections, primary and secondary members, to have the charging language first and outlines the appropriate exceptions thereto. This will lead to more consistent application and safer buildings without increasing the stringency of the provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal only restructures the code section language to be more understandable.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee concluded that the proposed text is not editorial. The proposal is making technical changes without providing technical justification. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Shane Nilles, City of Cheney, WABO TCD (snilles@cityofcheney.org); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

704.2 Protection of the primary structural frame . Members of the *primary structural frame* that are required to have protection to achieve a *fire-resistance rating* shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required *fire-resistance rating*. Where a column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Exceptions:

1. ~~Individual encasement protection is permitted to be interrupted where the primary structural member is in direct contact with another structural member.member~~Individual encasement protection on all sides shall be permitted on all exposed sides provided that the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.
2. Primary structural members other than columns that do not support more than two floors or one floor and roof, or a load-bearing wall or a nonload-bearing wall more than two stories high, are permitted to be protected by the membrane of a fire-resistance rated wall or horizontal ~~assembly.~~assembly where the membrane provides the required *fire-resistance rating*.
3. ~~Members that are integral elements in walls of light-frame construction, including studs, columns, and boundary elements located entirely between the top and bottom plates or tracks, shall be permitted to be protected by the membrane of a fire-resistance rated wall assembly.~~Columns that meet the limitations of Section 704.3.1.

704.3 Protection of secondary structural members . *Secondary structural members* that are required to have protection to achieve a*fire-resistance rating* shall be protected by individual encasement protection,or by the membrane of a fire-resistance rated wall or horizontal assembly,where the membrane provides the required *fire-resistance rating*~~, or a combination of both.both.~~

704.3.1 Light-frame construction . Studs, columns and boundary elements that are integral elements in*walls* of *light-frame construction* and are located entirely between the top and bottom plates or tracks shall be permitted to have required*fire-resistance ratings* provided by the membrane protection provided for the *wall*.

704.3.2 Horizontal assemblies . *Horizontal assemblies* are permitted to be protected with a membrane or ceiling where the membrane or ceiling provides the required *fire-resistance rating* and is installed in accordance with Section 711.

Commenter's Reason: The proposal was intended to rewrite and rearrange the sections without changing the intent. The committee felt that the language rewriting has some unintended consequences. We have addressed those concerns by maintaining the existing language that was identified as being critical, while still providing for a much-needed restructuring to make the code easier to interpret and apply. In that process we determined that there are some perceivable technical changes that we feel are still consistent with the intent and how these sections are most commonly interpreted:

1. The exception permitting the individual encasement of primary structural members to be provided on exposed sides only where the unexposed sides are other elements that afford the same required protection has been expanded to apply to columns as well.
2. Currently there is a hole in the code where there is no type of protection method prescribed for primary structural members that do not support more than two floors or one floor and roof, or a load-bearing wall or a nonload-bearing wall more than two stories high, the proposal clarifies that the intent is that they must still be protected, but rather than by "individual encasement", they are permitted to be protected by the membrane on an assembly they are located in.
3. Currently the main section for secondary members is to be protected by individual encasement only, but then there are two subsections that clarify those within horizontal assemblies, or light-frame walls, are permitted to be protected by the membrane of the horizontal assembly or wall respectively. This suggests that secondary members are actually intended to be protected by either individual encasement, or by the membrane of an assembly, which may be selected by the designer depending on what is more feasibly constructive and appropriate. The proposal simply adds that language into the charging language to be clearer.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
There should be negligible or no change in costs. The proposal is primarily to clarify the intent of the code. Clarified language may lead to a decrease in costs in areas where membrane protection clarified to be allowed on secondary members in lieu of individual encasement.

Final Hearing Results

FS9-21	AMPC1

FS9-22

Original Proposal

IBC: [BS] 1404.17

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.5 ~~1404.17~~ Fastening. Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other *approved* corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.2 or the*approved* manufacturer's instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with *approved* mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of *wood structural panels* as specified in Table 2308.6.3(3).

Reason: This proposal moves Section 1404.17 to Section 1404.5 without making technical changes. The fastening requirements for exterior wall coverings apply across multiple cladding types and should be located earlier in Section 1404, prior to addressing the specific claddings. This approach is consistent with the approach taken in the IRC and for other similar requirements in the IBC such as water-resistive barriers and flashing that apply to multiple exterior wall covering conditions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a formatting change with no change to requirements or cost.

Public Hearing Results

Committee Action **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Disapproved by request of proponent. The committee noted that the proposal needs updating and clarification of terms. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Jay Crandell, ABTG / ARES Consulting, P.E., ABTG / ARES Consulting (jcrandell@aresconsulting.biz); Wayne Jewell, Green Oak Charter Township, Green Oak Charter Township (wayne.jewell@greenoaktwp.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[BS] 1404.5 Fastening. ~~Weather boarding and~~ *Exterior wall coverings* shall be securely fastened with ~~aluminum, copper, zinc, zinc-coated or other~~ ~~*approved*~~ corrosion-resistant fasteners in accordance with this code ~~the nailing schedule in Table 2304.10.2~~ or the *approved* manufacturer's instructions. ~~Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with~~ ~~*approved*~~ ~~mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of~~ ~~*wood structural panels*~~ ~~as specified in Table 2308.6.3(3)~~.

Commenter's Reason: Consistent with the committee's reason and proponents request, this PC updates and properly generalizes an outdated provision from the legacy codes for fastening of "weather boarding" and "wall coverings" in addition to the original proposal's intent to update the location of 1404.17 by moving it to Section 1404.5 (similar to that done for general fastening requirements in Section R703 for the IRC).

The IBC has changed much since the legacy subsection 1404.17 was initially placed in the IBC original draft. Its terminology is outdated as well as its application which only applies to the few "legacy" types of wall coverings in the building codes prior to the time of the IBC. Thus, this PC deletes legacy terms and uses the defined term "exterior wall covering". It also deletes reference to "shingles" which is not a cladding or veneer addressed in Section 1404 for exterior walls (i.e., manufacturer's instructions must be used). Reference to specific fastener material types is deleted in favor of a general reference to "corrosion-resistant fasteners" as commonly used in the IBC and IRC.

This proposal is compatible with a separate public comment on proposal FS8-22, but can also stand alone.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal updates and relocates an "orphaned" section of code without changing requirements.

Final Hearing Results

FS9-22	AMPC1

FS11-21

Original Proposal

IBC: 704.6.1

Proponents: Bill McHugh, The McHugh Company, National Fireproofing Contractors Association (billmchugh-jr@att.net)

2021 International Building Code

Revise as follows:

704.6.1 Secondary attachments to structural members.
Where primary and secondary structural steel members require fire protection, secondary<u>tubular</u> steel attachments to those structural members shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than 12 inches (305 mm), or shall be applied to the entire length where the attachment is less than 12 inches (305 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

Reason: We applaud the proponent that added this new section for fire-resistance-rated protection of secondary steel attachments to structural steel building elements. While we supported the original proposal that dealt with only tubular steel secondary attachments, we believe the approved Public Comment far exceeds the 2018/2019 Fire Safety Committee's Action to protect only tubular - substantial attachments - to the secondary structural frame. It extends the protection to ANY steel attachments to the primary and secondary structural frame of the building.
The new code language means that thin hanger wire that holds up ceiling grid and other items such as ½" or less threaded rod that also holds up items above ceilings must be protected with fire-resistive materials of thickness equal to or greater than the attachments.

Experts in fire resistance testing from a major testing laboratory and suspended ceiling manufacturer have stated "heat transfer from hanger wires or small rods have never melted or caused failure of the secondary members to which they are attached. The wires and rods elongate during the fire test, but remain through the end of the fire-tests." These experts also state that in fire tests of assembles where ceiling panels or gypsum panels are used, the wires and rods melt when the assembly eventually fails. These attachments are not substantial steel items that make a difference to the building fire safety - but are now are required to have 12" of protection.

To protect wires and rods for 12" means some kind of wire mesh cage must be fabricated around the wire or rod to allow the fireproofing thickness to build and provide required protection. This new requirement – that does extend to thin 12ga. hanger wire and small threaded rods – adds unjustified cost to the project without proof that it adds to safety.

Finally, there is no tested and listed system design in the UL Product iQ currently that requires 12" protection of threaded rods or ceiling hanger wire. That's why we request reverting back to the original proposal prior to the PCH last cycle, which refers to only tubular attachments that can cause problems on the structure.

Cost Impact: The code change proposal will decrease the cost of construction
The cost impact will be that the small attachments defined in the proposal will not require protection, reducing costs significantly. The amount of reduction varies based on the number of small attachments, the presence of a hanging ceiling with metal grid and ceiling tiles, or other building service items such as ducts, cables and pipes, that might hang from a fire-resistance-rated assembly. .

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 704.6.1 Secondary attachments to structural members

Where primary and secondary structural steel members require fire protection, ~~secondary tubular steel attachments to those structural members~~ any additional structural steel members having direct connection to the primary structural frame or secondary structural members shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than 12 inches (305 mm), or shall be applied to the entire length where the attachment is less than 12 inches (305 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

Committee Reason: The committee deemed the modification is capturing what was missing from the original proposal. The committee also concluded that the reason statement is convincing that a modifier is needed before steel attachments. The committee encouraged the proponent to work with other suggested additions in the public comment phase, including addressing the word "structural" and addressing the heat transfer issue. (Vote: 13-0)

Final Hearing Results

FS11-21	AM

FS11-22

Original Proposal

IBC: [BS] 1404.18, [BS] 1404.18.1 (New), [BS] 1404.18.1.1 (New), [BS] 1404.18.1.1.1 (New), [BS] 1404.18.1.1.2 (New), [BS] 1404.18.2 (New)

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] 1404.18 Polypropylene siding. *Polypropylene siding* conforming to the requirements of this section and complying with Section 1403.12 shall be limited to *exterior walls* located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. ~~*Polypropylene siding* shall be installed in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the building so as to provide weather protection for the*exterior walls* of the building.~~

Add new text as follows:

[BS] 1404.18.1 Installation. Unless otherwise specified in the approved manufacturer's instructions,*Polypropylene siding* and accessories shall be installed over and attached to wood structural panel sheathing with minimum thickness of 7/16 inch (11.1 mm), or other nailable substrate.

[BS] 1404.18.1.1 Accessories. Accessories shall be installed in accordance with the approved manufacturer's instructions.

[BS] 1404.18.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location.

[BS] 1404.18.1.1.2 Under Windows and Top of Walls. Where nail hem is removed such as under windows and at top of walls, nail slot punch or predrilled holes shall be constructed.

[BS] 1404.18.2 Fastener requirements. Unless otherwise specified in the approved manufacturer's instructions, nails shall be corrosion resistant, with a minimum 0.120-inch (3 mm) shank and minimum 0.313-inch (8 mm) head diameter. Nails shall be a minimum of 1 1/4 inches (32 mm) long or as necessary to penetrate sheathing or nailable substrate not less than 3/4 inch (19.1 mm). Where the nail fully penetrates the sheathing or nailable substrate, the end of the fastener shall extend not less than 1/4 inch (6.4 mm) beyond the opposite face of the sheathing or nailable substrate. Spacing of fasteners shall be installed in accordance with the approved manufacturer's instructions.

Reason: This addition brings in critical installation elements for and polypropylene siding.
Two critical applications are starter strip and utility trim, are important to highlight as they are part of the wind performance system. In some instances, systems have been installed in high wind events incorrectly resulting in product performance failure. These are standard installation procedures for horizontal polymeric cladding.

In addition this proposal highlights the need for proper nail size, spacing uniqueness, and the need to for the installation over a proper nailable substrate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change brings in critical required installation practices for the product category.

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Modification:
[BS]1404.18.1 Installation. ~~Unless otherwise specified in the approved manufacturer's instructions,~~*Polypropylene siding* and accessories shall be installed over and attached to wood structural panel sheathing with minimum thickness of 7/16 inch (11.1 mm), ~~or other~~ nailable substrate,or other substrate suitable for mechanical fasteners in accordance with the approved manufacturer's instructions.

~~**[BS]1404.18.1.1 Accessories.** Accessories shall be installed in accordance with the approved manufacturer's instructions~~.

~~**[BS]1404.18.1.1.1 Starter Strip.** Horizontal siding shall be installed with a starter strip at the initial course at any location~~.

~~**[BS]1404.18.1.1.2 Under Windows and Top of Walls.** Where nail hem is removed such as under windows and at top of walls, nail slot punch or predrilled holes shall be constructed.~~

Committee Reason: Approved as modified as the proposal provides needed supplemental information for polypropylene siding. Some committee members were concerned that it adds to the responsibility of the Building Official. The modifications simplifies the language to rely on manufacture's instructions and to address alternative material. (Vote: 8-6)

Final Hearing Results

FS11-22 AM

FS12-21

Original Proposal

IBC: 705.2.3.1

Proponents: Stephen DiGiovanni, Clark County, Self (sdigiovanni@clarkcountynv.gov)

2021 International Building Code

Revise as follows:

705.2.3.1 Balconies and similar projections. Balconies and similar projections of combustible construction other than *fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. The aggregate length of the projections shall not exceed 50 percent of the building's perimeter on each floor.

Exceptions:

1. On buildings of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.
2. Untreated wood and plastic composites that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on buildings of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.

Reason: The Ad Hoc Committee for Tall Wood Buildings (TWB) was formed by the ICC Board of Directors in 2016 to explore the building science of tall wood buildings with the scope to investigate the feasibility of and take action on developing code changes. A total of 17 proposals were presented and approved in the Group A and Group B code cycles leading to the 2021 edition of the I-codes. Having provided the technical foundation for deploying tall wood buildings in the various codes, the Ad Hoc Committee for Tall Wood Buildings was sunset in 2020.

Upon reflection of the codes, there appears to be at least one item that was not adequately addressed by the TWB. In particular, this proposal seeks to address the allowance of balconies and similar projections on Type IV buildings to be constructed of Type V construction.

A goal of the TWB code changes was to minimize exterior fire spread for Type IV buildings that were proposed for increased heights over what was previously permitted for traditional Type IV Heavy Timber construction. The committee took particular care in eliminating combustibles from the exterior walls for Types IV-A, IV-B, and IV-C construction, as evidenced by the language presented for IBC Section 602.4. The only combustibles permitted are mass timber elements, and a water barrier. Outboard of these materials, the proposals required non-combustible protection with a minimum rating of 40 minutes. The allowances in IBC 705.2.3.1 to allow Type V balconies and projection, exterior of and thus without the benefit of the non-combustible protection, are incongruent with the TWB code proposals in terms of the type of construction materials allowed and the lack of protection in place. While it can be argued that the specific language in Section 602.4 overrides the general exception in Section 705.2.3.1, still the apparent conflicting provisions would benefit from clarification. For this reason, the proposed fix is being offered. In adding the new construction types, the TWB took care to not affect the existing requirements for traditional Type IV Heavy Timber construction. Where the TWB found codes that were to be maintained for traditional Type IV construction, but were not applicable to the new Type IV-A, IV-B, and IV-C construction types, the committee proposed a change to add the -HT designator, to clarify the particular code requirement applied to Type IV-HT only.

Thus, in order to correct an apparent code conflict, to clarify the intent of the TWB, and to maintain consistency with the traditional Type IV Heavy Timber construction, the proposal simply seeks to add a "-HT" designator to the Type IV construction addressed in Exception 3, thus eliminating the perceived allowance of adding balconies and similar projections of Type V construction for new Types IV-A, IV-B and IV-C construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Cost impact is based on interpretation of the code conflict between IBC 602.4 and IBC 705.2.3.1. The author's interpretation is that Type V balconies are not currently permitted on Types IV-A, IV-B, and IV-C construction, and that this proposal only seeks to clarify the code's intent, and thus there is no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal clarifies and corrects the type of construction within the exception. The committee encourages the proponent to fix the conflict with section 705.2.2. (Vote: 8-5)

Final Hearing Results

FS12-21	AS

FS12-22

Original Proposal

IBC: TABLE 2603.13.1, TABLE 2603.13.2

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] TABLE 2603.13.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE[~~b~~c]	CLADDING FASTENER VERTICAL SPACING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[~~c~~d] (INCHES)							
			16″ o.c. fastener horizontal spacing				24″ o.c. fastener horizontal spacing			
			Cladding weight:				Cladding weight:			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Wood Framing (minimum 1 $^1/_4$- inch penetration)[b]	0.113" diameter nail	6	2.00	1.45	0.75	DR	2.00	0.85	DR	DR
		8	2.00	1.00	DR	DR	2.00	0.55	DR	DR
		12	2.00	0.55	DR	DR	1.85	DR	DR	DR
	0.120" diameter nail	6	3.00	1.70	0.90	0.55	3.00	1.05	0.50	DR
		8	3.00	1.20	0.60	DR	3.00	0.70	DR	DR
		12	3.00	0.70	DR	DR	2.15	DR	DR	DR
	0.131" diameter nail	6	4.00	2.15	1.20	0.75	4.00	1.35	0.70	DR
		8	4.00	1.55	0.80	DR	4.00	0.90	DR	DR
		12	4.00	0.90	DR	DR	2.70	0.50	DR	DR
	0.162" diameter nail	6	4.00	3.55	2.05	1.40	4.00	2.25	1.25	0.80
		8	4.00	2.55	1.45	0.95	4.00	1.60	0.85	0.50
		12	4.00	1.60	0.85	0.50	4.00	0.95	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.

DR = Design Required, o.c. = on center.

a. Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. The thickness of wood structural panels complying with the specific gravity requirement of Note a shall be permitted to be included in satisfying the minimum penetration into framing.

~~b.~~c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

~~c.~~d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

[BS] TABLE 2603.13.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (INCHES)[c]	FASTENER SPACING IN FURRING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING[~~d~~e] (INCHES)							
					16″ o.c. furring[~~e~~f]				24″ o.c. furring[~~e~~f]			
					Siding weight:				Siding weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 1x Wood Furring[~~e~~d]	Minimum 2x Wood Stud	0.131" diameter nail	1 $^1/_4$	8	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (INCHES)	FASTENER SPACING IN FURRING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING (INCHES)							
					16" o.c. furring				24" o.c. furring			
					Siding weight:				Siding weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162" diameter nail	$1^1/_4$	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No. 10 wood screw	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		$^1/_4$" lag screw	$1^1/_2$	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood framing and furring shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. The thickness of wood structural panels complying with the specific gravity requirements of Note a shall be permitted to be included in satisfying the minimum required penetration into framing.

~~c.~~d. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.

~~d.~~e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C587 or ASTM C1289.

~~e.~~f. Furring shall be spaced not greater than 24 inches on center in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

Reason: This proposal adds a new footnote to Tables 2603.13.1 and 2603.13.2 to coordinate with changes made to identical tables in the 2021 IRC. Wood structural panels have fastener dowel bearing and shear capacities similar to that for wood framing and can be safely included in determining the embedment depth required for fasteners in accordance with Tables 2603.13.1 and 2603.13.2.

Cost Impact: The code change proposal will decrease the cost of construction
The impact will be a small decrease in cost due to slightly less cladding fastener length required for embedment in wood framing where wood structural panels are used and contribute to the fastener embedment. This will also improve constructability in marginal cases based on availability of fasteners of a suitable length to meet the required embedment.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposed Table footnote is useful and appropriate. (Vote: 13-1)

Final Hearing Results

FS12-22	AS

FS16-21

Original Proposal

IBC: TABLE 705.5

Proponents: Eric Bressman, Ankrom Moisan Architects, Ankrom Moisan Architects (ericb@ankrommoisan.com)

2021 International Building Code

Revise as follows:

TABLE 705.5 FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a, d, g]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[e]	OCCUPANCY GROUP F-1, M, S-1[f]	OCCUPANCY GROUP A, B, E, F-2, I, R[i], S-2, U[h]
X < 5[b]	All	3	2	1
5 ≤ X < 10	IA, IVA	3	2	1
	Others	2	1	1
10 ≤ X < 30	IA, IB, IVA, IVB	2	1	1[c]
	IIB, VB	1	0	0
	Others	1	1	1[c]
X ≥ 30	All	0	0	0

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

b. See Section 706.1.1 for party walls.

c. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.

d. The fire-resistance rating of an exterior wall is determined based upon the fire separation distance of the exterior wall and the story in which the wall is located.

e. For special requirements for Group H occupancies, see Section 415.6.

f. For special requirements for Group S aircraft hangars, see Section 412.3.1.

g. Where ~~Table 705.8~~ Section 705.8.1 permits nonbearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.

h. For a building containing only a Group U occupancy private garage or carport, the exterior wall shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet (1523 mm) or greater.

i. For a Group R-3 building of Type II-B or Type V-B construction, the exterior wall shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet (1523 mm) or greater.

Reason: The current language in the footnote refers to the table and not the charging language that sends you to the table. By structuring the reference in this manner, the two exceptions in the charging language are excluded. These two exceptions allow for 100% unprotected openings. It stands to reason that if the entire wall can be unprotected openings, then any solid portion of the wall should not require a fire rating. The footnote should tie to the charging language of the Section and not the table. While the 2nd exception is already accounted for in the body of Table 602 (Types IIB and VB construction), the current language does not capture the first exception for ground floor storefronts with the prescribed *fire separation distance* or unoccupied space. This results in a situation where a designer can have a wall with 100% unprotected openings per this exception, but if any part of the wall is not an opening it is required to be rated per Table 705.5.

Cost Impact: The code change proposal will decrease the cost of construction
There is potential for a small cost savings for projects not required to rate the ground floor walls due to the added exception.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposed code change is a good adjustment and better coordination with other related code sections. The proposal does not introduce new technical changes. (Vote: 13-0)

Final Hearing Results

FS16-21	AS

FS18-21

Original Proposal

IBC: 705.6 (New), 705.6

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Building Code

Add new text as follows:

705.6 Continuity. The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a one-hour fire-resistance rated floor/ceiling or roof/ceiling assembly.

Parapets shall be provided as required by Section 705.11.

Revise as follows:

~~705.6~~ 705.7 Structural stability. ~~*Exterior walls* shall extend to the height required by Section 705.11.~~ Interior structural elements that brace the *exterior wall* but that are not located within the plane of the *exterior wall* shall have the minimum *fire-resistance rating* required in Table 601 for that structural element. Structural elements that brace the *exterior wall* but are located outside of the *exterior wall* or within the plane of the *exterior wall* shall have the minimum *fire-resistance rating* required in Table 601 and Table 705.5 for the *exterior wall.*

Reason: This is the same proposal that was brought forth last code cycle, FS-19. Steve pointed out a problem with the code in the continuity of exterior wall ratings. While his proposal may have been too simplistic, it really does provide the needed clarification on how to address the continuity of the required exterior wall rating. This is a huge issue in Type III construction where there is little direction on how the supporting construction for the exterior walls are to be rated, especially in the case of a parapet. FS-20 of the same code cycle got into too many specific requirements but attempted to address the same concern.

Cost Impact: The code change proposal will decrease the cost of construction
I like the Steve Thomas's reason statement from last cycle - this will reduce the cost because confusion will be eliminated and people won't be making things up.

In all seriousness, this could reduce the cost of construction as it will clearly define how exterior wall continuity is to be provided.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee concluded that the proposal is not clear enough and missing significant technical aspects. The committee recommended that the proponent work on more clarification during the public comment phase. Such as addressing the intersection with a rated roof ceiling assembly and protecting the sides. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

705.6 Continuity . The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ~~one-hour fire-resistance rated~~ floor/ceiling or roof/ceiling ~~assembly.~~ assembly having a fire-resistance rating equal to or greater than the exterior wall and the fire separation distance is greater than 10 feet.

Parapets shall be provided as required by Section 705.11.

705.11.1 Parapet construction . Required ~~Parapets~~ parapets shall have the same *fire-resistance rating* as that required for the supporting wall, and on any side adjacent to a roof surface, shall have noncombustible faces for the uppermost 18 inches (457 mm), including counterflashing and coping materials. The height of the parapet shall be not less than 30 inches (762 mm) above the point where the roof surface and the wall intersect. Where the roof slopes toward a parapet at a slope greater than 2 units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within a *fire separation distance* where protection of wall openings is required, but the height shall be not less than 30 inches (762 mm).

Commenter's Reason: The committee was concerned that the original code change was too broad and missing technical aspects. There was concern about how the floor/ceiling or roof/ceiling assemblies that may carry a higher rating were to be addressed. There was also concern about an exterior wall condition that may have been needing a rating due to proximity to the property line, thus the added language on the fire separation distance.
The additional language to the parapet section is to clearly indicate that when the parapet is required, then it must comply. Parapets may be provided on a building which are not required and in those instances, the parapet does not need to comply with the parapet language.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
With the clarification on how exterior wall continuity is to be provided, it may decrease the cost of construction.

Final Hearing Results

FS18-21	AMPC1

FS19-21

Original Proposal

IBC: 705.6.1 (New), 705.6.1.1 (New)

Proponents: David Tyree, American Wood Council, AWC (dtyree@awc.org); Paul Coats, American Wood Council, American Wood Council (pcoats@awc.org)

2021 International Building Code

Add new text as follows:

705.6.1 Supporting construction. Construction that supports gravity loads from fire-resistance-rated exterior walls shall have a fire-resistance rating that is equal to or greater than the required fire resistance rating of the supported wall. For achieving the required fire resistance rating for exposure from the interior of the building, ceiling materials shall be permitted to contribute to the required fire-resistance of the supporting construction.

705.6.1.1 Materials. The material requirements of floor/ceiling assemblies shall be in accordance with requirements for interior building elements for the Type of Construction, including portions of the floor/ceiling construction that support gravity loads from an exterior wall.

Reason: There is increasing controversy about the requirements for loadbearing exterior walls in Type III construction when floors intersect the exterior wall in typical "platform" framing. Driving this are overlapping concerns for maintaining the fire resistance of the exterior wall at the intersection with the floor, as well as material requirements for the floor structure, given that the wall itself is required to be fire-retardant treated wood if wood framing is used.
Platform framing can be accomplished without compromising the fire resistance of the exterior wall. When an unrated or one-hour fire-resistance rated floor intersects and supports the two-hour exterior wall at each floor level, the code requires the construction supporting the wall to have the same fire-resistance rating as the supported wall. This can be accomplished by several means, such as providing extra rim board members or blocking, and extra protection for the floor elements at the intersection. AWC's Design for Code Acceptance No. 3 (DCA 3) document has design details to maintain the required fire resistance of the wall for fire exposure from the interior of the building, and, when required by IBC Section 705.5, for exposure from the exterior as well. One example of these details (there are four details in DCA 3) is shown below this reason statement.

Maintaining the fire resistance of supporting construction plays a much more important role in the performance of the wall than the use of fire-retardant treated wood in the supporting floor. There is no demonstrated increase in fire-resistance rating for fire-retardant-treated wood when compared to untreated wood. Fire-retardant treated wood exhibits reduced flame spread, but it does not increase the fire-resistance rating of the assembly. In other words, requiring the end of the floor to be fire-retardant treated does not increase the fire-resistance of the wall. The code does not require elements of the floor to be fire-retardant treated even if they serve to support the gravity loads from the wall above. However, it does require those supporting floor elements to provide fire resistance equal to that required for the wall.

The current code language is subject to multiple interpretations, including requiring the floor elements to be fire-retardant-treated or prohibiting platform details altogether. These interpretations are costly and do not serve to increase safety. Often, they may jeopardize the fire performance of the floor for the sake of protecting the wall. The proposed subsections will clarify the issues, encouraging a practical and effective approach without compromising fire resistance or safety.

[Below page 7 from DCA 3 here: Figure 1B example detail and accompanying "methodology" notes]

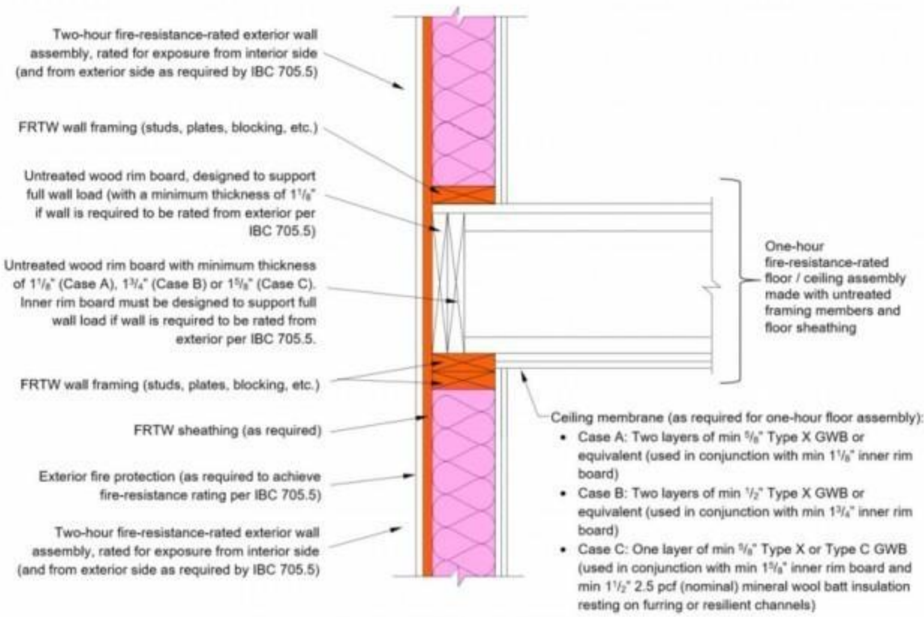


Figure 1B: Example detail for Type III-A exterior wall–floor intersection with two rim boards

Methodology:

Fire-resistance for exposure from interior side:

- Case A: Minimum $1\frac{1}{8}$-inch-thick inner rim board plus two layers of minimum $\frac{5}{8}$ in. Type X GWB in the ceiling membrane provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface plus 40 minutes for each layer of $\frac{5}{8}$ in. Type X GWB (per IBC Table 722.6.2(1)).
- Case B: Minimum $1\frac{3}{4}$-inch-thick inner rim board plus two layers of minimum $\frac{1}{2}$ in. Type X GWB in the ceiling membrane provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface plus 25 minutes for each layer of $\frac{1}{2}$ in. Type X GWB (per IBC Table 722.6.2(1)).
- Case C: Minimum $1\frac{5}{8}$-inch-thick inner rim board plus one layer of minimum $\frac{5}{8}$ in. Type X GWB in the ceiling membrane plus minimum $1\frac{1}{2}$-inch-thick, 2.5 pcf (nominal) mineral wool batt insulation provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface, plus 40 minutes for the $\frac{5}{8}$ in. Type X GWB (per IBC Table 722.6.2(1)), plus 15 minutes for the mineral wool batt insulation.

The outer rim board must be designed to support the load from the wall above.

Fire-resistance for exposure from exterior side (where required per IBC Section 705.5): A combination of exterior fire protection, FRTW sheathing, and minimum $1\frac{1}{8}$-inch-thick outer rim board is used to provide two hours of protection to the inner rim board. Layers to the exterior of the outer rim board (e.g., exterior fire protection, FRTW sheathing, etc.) must be sufficient to provide at least 80 minutes of protection to the outer rim board. The inner rim board must be designed to support the load from the wall above.

Note: *NDS®* is the *2018 National Design Specification® for Wood Construction*

Bibliography: AWC Design for Code Acceptance (DCA) 3 - Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies can be downloaded at https://awc.org/codes-standards/publications/dca3

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change only clarifies the intent of this section for more uniform and consistent application. It may decrease costs in some jurisdictions depending on interpretation and application of the current code language.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee concluded that the proposed language is confusing for the building official. The committee recommended that the proposed language is a good step in the right direction but needs to address more aspects, such as intersections and rated assemblies. (Vote: 7-5)

Public Comments

Public Comment 1

Proponents: David Tyree, American Wood Council, AWC (dtyree@awc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

705.6.1 ~~Supporting construction~~ Floor Assemblies in Type III Construction . ~~Construction that~~ In Type III construction where a floor assembly supports gravity loads from ~~fire-resistance-rated exterior walls shall have a fire-resistance rating that is equal to or greater than the required fire resistance rating of the supported wall. For achieving the required fire resistance rating for exposure from the interior of the building, ceiling materials shall be permitted to contribute to the required fire-resistance of the supporting construction.~~ an exterior wall, the fire-resistance rating of the portion of the floor assembly that supports the exterior wall shall not be less than the fire-resistance rating required for the exterior wall in Table 601. The fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for interior building elements of Type III Construction.

~~705.6.1.1 Materials .~~ ~~The material requirements of floor/ceiling assemblies shall be in accordance with requirements for interior building elements for the Type of Construction, including portions of the floor/ceiling construction that support gravity loads from an exterior wall.~~

Commenter's Reason: The original proposal is rewritten to address opposition testimony and comments from the committee members during their discussion. The reason statement provided with the original proposal is applicable and pertinent to what is being proposed in this public comment and should be made a part of the record.
Following is a detailed explanation of the proposed text addressing each of the statements made in opposition to this proposal. The first sentence of 705.6.1 limits the application of this section to ONLY Type III construction. No other material interests are affected. Although it is not stated, the criteria will most commonly apply to platform construction where the floor assembly is supported by the top of the wall below and the wall above is supported by that floor assembly. The portion of the floor assembly directly within the gravity load path of the exterior wall is required to provide a two-hour fire-resistance rating as required by Table 601. This requirement is to ensure the fire resistance rating required of the exterior wall of the story above, will continue through the supporting segment of the floor assembly, to the exterior wall of the story below. The second sentence states that it is permissible to consider the contribution from the ceiling membrane when assessing the fire-resistance rating of the floor assembly at the exterior wall. A ceiling membrane may or may not be present, but as shown in AWC's DCA3, it is an appropriate design assumption to consider its contribution when the fire rating of the floor assembly supporting the exterior wall is to be based on fire exposure from the interior of the building.

The original section and subsection have now been combined to better clarify the construction and fire-resistive requirements of the intersection of the exterior wall and floor construction. With the combination of all of the requirements in one section, it clarifies the nature of the material permitted as building elements in the floor construction of Type III construction. The terms “building element” and “floor construction” are from Table 601 to eliminate confusion. Typically, material at the perimeter of the floor assembly (construction) may include a single rim joist, multiple rim joists and/or blocking to achieve the required fire-resistance rating, while also maintaining a gravity load path for the duration of the required fire resistance rating. AWC's DCA 3 provides specific examples of how this can be achieved. Material requirements for the materials within the wall space but part of the floor construction are to be consistent with what is required for the interior floor assembly, not the exterior wall. For example, if the exterior wall studs are light gauge steel, the perimeter material in the floor assembly which bears on the wall below can be constructed of any material permitted for the interior building elements in Type III construction, provided the required fire resistance rating, as clarified in 705.6.1, is demonstrated.

To better understand how these revisions interrelate to the original proposal, we felt it would be helpful to include the section in it's entirety so it could be reviewed and considered in the proper context as follows:

> **705.6 Structural stability.** Exterior walls shall extend to the height required by Section 705.11. Interior structural elements that brace the exterior wall but that are not located within the plane of the exterior wall shall have the minimum fire-resistance rating required in Table 601 for that structural element. Structural elements that brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum fire-resistance rating required in Table 601 and Table 705.5 for the exterior wall.

705.6.1 Floor Assemblies in Type III Construction.
In Type III construction where a floor assembly supports gravity loads from an exterior wall, the fire-resistance rating of the portion of the floor assembly that supports the exterior wall shall not be less than the fire-resistance rating required for the exterior wall in Table 601. The fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for interior building elements of Type III Construction.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This code change only clarifies the intent of this section for more uniform and consistent application. It may decrease costs in some jurisdictions depending on interpretation and application of the current code language.

Final Hearing Results

FS19-21	AMPC1

FS21-21

Original Proposal

IBC: TABLE 705.8

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c, k]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted[k]
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted[k]
	Protected (P)	Not Permitted[k]
3 to less than 5[d, e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	15%
	Protected (P)	15%
5 to less than 10[e, f, j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%
10 to less than 15[e, f, g, j]	Unprotected, Nonsprinklered (UP, NS)	15%[h]
	Unprotected, Sprinklered (UP, S)[i]	45%
	Protected (P)	45%
15 to less than 20[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	25%
	Unprotected, Sprinklered (UP, S)[i]	75%
	Protected (P)	75%
20 to less than 25[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	45%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
25 to less than 30[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	70%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
30 or greater	Unprotected, Nonsprinklered (UP, NS)	No Limit
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit

For SI: 1 foot = 304.8 mm.

UP, NS = Unprotected openings in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

UP, S = Unprotected openings in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

P = Openings protected with an opening protective assembly in accordance with Section 705.8.2.

a. Values indicated are the percentage of the area of the exterior wall, per story.

b. For the requirements for fire walls of buildings with differing heights, see Section 706.6.1.

c. For openings in a fire wall for buildings on the same lot, see Section 706.8.

d. The maximum percentage of unprotected and protected openings shall be 25 percent for Group R-3 occupancies.

e. Unprotected openings shall not be permitted for openings with a fire separation distance of less than 15 feet for Group H-2 and H-3 occupancies.

f. The area of unprotected and protected openings shall not be limited for Group R-3 occupancies, with a fire separation distance of 5 feet or greater.

g. The area of openings in an ~~open parking structure~~ *open parking garage* that complies with Section 406.5 with a fire separation distance of 10 feet or greater shall not be limited.

h. Includes buildings accessory to Group R-3.

i. Not applicable to Group H-1, H-2 and H-3 occupancies.

j. The area of openings in a building containing only a Group U occupancy private garage or carport with a fire separation distance of 5 feet or greater shall not be limited.

k. For openings between S-2 parking garage and Group R-2 building, see Section 705.3, Exception 2.

Reason: Footnote "g" allows an open parking structure to have unlimited openings where the fire separation distance is 10 feet or greater, but "open parking structure" is not defined and is up for interpretation - this proposal clarifies exactly what requirements must be met to allow unlimited openings. It is believed the intent is that this footnote is for open parking garages that comply with the special requirements in Chapter 4 for open parking garages. To clarify intent, this proposal revises "open parking structure" to defined term "*open parking garage*" and requires compliance with section 406.5 to use this footnote.

It should be noted that it is necessary to require compliance with 406.5 in addition to using the defined term since the defined term doesn't include all of the requirements in 406.5. For example, 406.5.1 requires Type I, II or V construction, but this isn't mentioned in the definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification that will not change the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c, k]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted[k]
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted[k]
	Protected (P)	Not Permitted[k]
3 to less than 5[d, e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	15%
	Protected (P)	15%
5 to less than 10[e, f, j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%
10 to less than 15[e, f, g, j]	Unprotected, Nonsprinklered (UP, NS)	15%[h]
	Unprotected, Sprinklered (UP, S)[i]	45%
	Protected (P)	45%
15 to less than 20[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	25%
	Unprotected, Sprinklered (UP, S)[i]	75%
	Protected (P)	75%
20 to less than 25[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	45%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
25 to less than 30[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	70%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
30 or greater	Unprotected, Nonsprinklered (UP, NS)	No Limit
	Unprotected, Sprinklered (UP, S)[i]	No Limit

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA
	Protected (P)	No Limit

For SI: 1 foot = 304.8 mm.

UP, NS = Unprotected openings in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

UP, S = Unprotected openings in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

P = Openings protected with an opening protective assembly in accordance with Section 705.8.2.

a. Values indicated are the percentage of the area of the exterior wall, per story.

b. For the requirements for fire walls of buildings with differing heights, see Section 706.6.1.

c. For openings in a fire wall for buildings on the same lot, see Section 706.8.

d. The maximum percentage of unprotected and protected openings shall be 25 percent for Group R-3 occupancies.

e. Unprotected openings shall not be permitted for openings with a fire separation distance of less than 15 feet for Group H-2 and H-3 occupancies.

f. The area of unprotected and protected openings shall not be limited for Group R-3 occupancies, with a fire separation distance of 5 feet or greater.

g. The area of openings in an *open parking garage* ~~that complies~~ in accordance with Section 406.5 with a fire separation distance of 10 feet or greater shall not be limited.

h. Includes buildings accessory to Group R-3.

i. Not applicable to Group H-1, H-2 and H-3 occupancies.

j. The area of openings in a building containing only a Group U occupancy private garage or carport with a fire separation distance of 5 feet or greater shall not be limited.

k. For openings between S-2 parking garage and Group R-2 building, see Section 705.3, Exception 2.

Committee Reason: The committee concluded the modification supports the original intent and better clarifies the text by replacing "that complies" with "in accordance with" section 406.5. The committee based their approval on the proponent's reason statement and concluded the proposal clarifies what requirements must be met to allow unlimited openings. (Vote: 13-0)

Final Hearing Results

FS21-21 AM

FS29-21

Original Proposal

IBC: 706.1.2 (New), 706.2

Proponents: David Collins, The Preview Group, Inc, The American Institute of Architects (dcollins@preview-group.com)

2021 International Building Code

Add new text as follows:

<u>**706.1.2 Double fire walls.** Double fire walls designed and constructed in accordance with NFPA 221 and its Annex shall be deemed to comply with this section.</u>

Revise as follows:

706.2 Structural stability. *Fire walls* shall be designed and constructed to allow collapse of the structure on either side without collapse of the wall under fire conditions. ~~*Fire walls* designed and constructed in accordance with NFPA 221 shall be deemed to comply with this section.~~

> **Exception:** In *Seismic Design Categories* D through F, where double *fire walls* are used in accordance with NFPA 221, floor and roof sheathing not exceeding $^3/_4$ inch (19.05 mm) thickness shall be permitted to be continuous through the wall assemblies of*light frame construction*.

Reason: The use of NFPA 221 for the design and construction of double fire walls is permitted in Section 706.2 regarding structural stability. Additional details and specific requirements in NFPA 221 go beyond simply structural stability and should be a part of the designated requirements for design of fire walls.

Cost Impact: The code change proposal will decrease the cost of construction
This code change adds clarification how NFPA 221 is used to provide for double fire walls which are signifiantly less expensive to build than independent fire walls.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 706.1.2 ~~Double fire walls~~ <u>Deemed to comply</u>. ~~Double~~ ~~f~~<u>F</u>ire walls designed and constructed in accordance with NFPA 221 and its Annex shall be deemed to comply with this section.

Committee Reason: The committee concluded the modification corrected the proposal by adding "Deemed to comply". The proposed change adds clarity to the code section by adding the Annex and NFPA 221. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: David Collins, The Preview Group, Inc, The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

706.1.2 Deemed to comply . Fire walls designed and constructed in accordance with NFPA 221~~and its Annex~~ and providing the reqired fire resistance required in Section 706.4 shall be deemed to comply with this section.

Commenter's Reason: An error in the changes was called to our attention after the committee hearing. NFPA 221 does not include a requirement for a specific fire resistance. It depends on the building code to set the fire resistance requirement. FS29 makes NFPA 221"deemed to comply" with Section 706 which includes the requierd fire resistance. Similarly, the NFPA 221 Annex includes non-mandrory languge which can cause problems with design and enforcement.
The code change committee approved this change as modified. With this additional modification, Section 706.4 is referenced directly to establish the necessary fire resistance and the NFPA 221 Annex material would no longer be referenced.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This clarification will not increase or decrease the cost of construction.

Public Comment 2

Proponents: Jonathan Siu, Self; David Collins, The Preview Group, Inc, The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

706.1.2 Deemed to comply. Fire walls designed and constructed in accordance with NFPA 221~~and its Annex~~ shall be deemed to comply with this sectionsubject to the limitations of Section 102.4. The required fire resistance rating shall be determined by Section 706.4.

Commenter's Reason: The purposes of this public comment are 1) to prevent adoption of commentary as code requirements; 2) to clarify that the code will still govern over the adopted reference standard; and 3) to clarify how to determine the fire-resistance rating for fire walls designed and constructed using NFPA 221. Our intent is to allow the use of NFPA 221 so designers can utilize the pieces in NFPA 221 to construct double fire walls and to rate each wall as prescribed in NFPA 221, as well as create vestibules for doors to facilitate connections through the fire wall, without reducing the protections required by the IBC.
First, as approved (as modified) by the committee, FS29-21 directly references the annex to NFPA 221—essentially, adopting the annex as code. However, according to introductory notes before the requirements and before the annex, the annex is clearly commentary ("Annex A is not part of the requirements of this NFPA document, but is included for informational purposes only. This annex contains explanatory material….")

Second, there are provisions in NFPA 221 that are less stringent than IBC or where NFPA 221 does not address a requirement in IBC. This public comment points the user back to IBC Section 102.4 to set the IBC provisions as the minimum requirements for fire wall construction.

As approved by the committee, NFPA 221 is a wholesale replacement for the IBC provisions for fire walls ("deemed to comply"). Essentially, nothing in IBC Section 706 would apply. Ordinarily, Section 102.4 would say that where there's a conflict between the code and a standard, the code governs. In this case, since NFPA 221 is "deemed to comply" with IBC, at least three requirements in the IBC will not be able to be enforced:

1. IBC 706.3 requires fire walls be constructed of noncombustible materials, with an exception for Type V construction. NFPA 221 doesn't appear to address fire wall materials at all. So one could argue that NFPA 221 would allow combustible materials in Types III and IV construction, where IBC would not. There is another code change that may align these but at this moment, there is a disconnect.
2. IBC allows termination of fire walls at the inside face of noncombustible exterior sheathing, exterior siding, or other exterior finishes (IBC 706.5 Exception 2). NFPA 221 adds "limited combustible" sheathing/siding/other finishes to the exception (NFPA 221 Section 6.9.1.2). "Limited combustibles" is not defined in the IBC, nor in NFPA 221, so it will be difficult for the code officials to enforce. In

addition, on its face, “limited combustibles” is less stringent than noncombustible.

3. IBC prohibits duct and air transfer openings at lot lines (IBC 706.1.1 and 706.11). NFPA 221 points back to the building code in Section 4.9.2 (“Unless required otherwise by the applicable building code…”), but since NFPA 221 is “deemed to comply,” IBC Section 706 is no longer in play. Therefore, there is no prohibition in NFPA 221 for duct and air transfer openings at lot lines/party walls.

Thirdly, NFPA 221 does not contain any requirements for fire resistance rating of the fire walls. On the other hand, it does provide the fire resistance of each wall in a double fire wall, whereas the IBC does not. This public comment points the user who wants comply with NFPA 221 to IBC 706.4 so they will know the required fire resistance ratings on which to base a design.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The original cost impact statement said the proposal will "add clarification how NFPA 221 is used to provide for double fire walls, which are significantly less expensive to build than independent fire walls." This public comment will not change that, and will not affect how fire walls are constructed under the IBC.

Final Hearing Results

FS29-21	AMPC1,2

FS35-21

Original Proposal

IBC: 706.6

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

706.6 Vertical continuity. *Fire walls* shall extend from the foundation to a termination point not less than 30 inches (762 mm) above both adjacent roofs.

Exceptions:

1. Stepped buildings in accordance with Section 706.6.1.
2. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab, provided that <u>all of the following requirements are met</u>:
   2.1. The lower *roof assembly* within 4 feet (1220 mm) of the wall has not less than a 1-hour*fire-resistance rating* and the entire length and span of supporting elements for the rated *roof assembly* has a *fire-resistance rating* of not less than 1 hour.

   2.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the*fire wall*.

   2.3. Each building shall be provided with not less than a Class B*roof covering*.
3. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck or slabs where both buildings are provided with not less than a Class B *roof covering*. Openings in the roof shall not be located within 4 feet (1220 mm) of the*fire wall*.
4. In buildings of Types III, IV and V construction, walls shall be permitted to terminate at the underside of combustible roof sheathing or decks, provided that all of the following requirements are met:
   4.1. Roof openings are not less than 4 feet (1220 mm) from the*fire wall*.

   4.2. The roof is covered with a minimum Class B *roof covering.*

   4.3. The roof sheathing or deck is constructed of*fire-retardant-treated wood* for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with $^5/_8$-inch (15.9 mm) Type X *gypsum board* directly beneath the underside of the roof sheathing or deck, supported by not less than 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
5. In buildings designed in accordance with Section 510.2,*fire walls* located above the 3-hour *horizontal assembly* required by Section 510.2, Item 1 shall be permitted to extend from the top of this *horizontal assembly*.
6. Buildings with sloped roofs in accordance with Section 706.6.2.

Reason: Exceptions 2 and 4 are similar in that they require that all of the requirements listed be met. However, the existing language in Exception 2 does not say this. This proposal is designed to make the two sections consistent and clarify the intent.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This language is intended to clarify the requirements and provide consistent language.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposed text clarifies that in order to qualify for Exception #2, all the subsections of #2 need to be complied with. (Vote: 13-0)

Final Hearing Results

FS35-21	AS

FS38-21

Original Proposal

IBC: 707.5

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

707.5 Continuity. *Fire barriers* shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such *fire barriers* shall be continuous through concealed space, such as the space above a suspended ceiling. *Joints* and voids at intersections shall comply with Sections 707.8 and 707.9

Exceptions:

1. *Shaft enclosures* shall be permitted to terminate at a top enclosure complying with Section 713.12.
2. *Interior exit stairway* and *ramp* enclosures required by Section 1023 and *exit access stairway* and *ramp* enclosures required by Section 1019 shall be permitted to terminate at a top enclosure complying with Section 713.12.
3. An *exit passageway* enclosure required by Section 1024.3 that does not extend to the underside of the floor or roof sheathing, slab or deck above shall be enclosed at the top with construction of the same *fire-resistance rating* as required for the *exit passageway*.

Reason: The current wording of Exception 3 is for fire barriers of exit passageways that don't extend to the underside of the roof sheathing, slab or deck above. Exit passageways typically occur on the level of exit discharge and extend to the floor above instead of the roof above, so the wording in Exception 3 is proposed to be revised to apply to fire barriers that don't extend to the underside of floor or roof sheathing, slab or deck above. This wording is identical to wording in the body of this section.

This proposal also corrects a typo by adding a space between "*rating*" and "as".

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is a clarification that will not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposed text clarifies the technical requirements and per the proponent's reason statement with respect to taking into account exit passageways that occur on the level of exit discharge in a multiple-story bldg. (Vote: 13-0)

Final Hearing Results

FS38-21	AS

FS40-21

Original Proposal

IBC: 707.6, 707.7, 707.7.1

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Building Code

Revise as follows:

707.6 Openings. Openings in a *fire barrier* shall be protected in accordance with Section 716. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet (15 m^2). Openings in enclosures for*shafts* ~~*exit access stairways* and *ramps*~~, *interior exit stairways* and *ramps* and *exit passageways* shall also comply with Sections 713.7 ~~1019~~, 1023.4 and 1024.5, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an*automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a *fire door* serving enclosures for *exit access stairways* and *ramps,* and *interior exit stairways* and *ramps.*
3. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective has been tested in accordance with ASTM E119 or UL 263 and has a minimum *fire-resistance rating* not less than the *fire-resistance rating* of the wall.
4. *Fire window assemblies* permitted in *atrium* separation walls shall not be limited to a maximum aggregate width of 25 percent of the length of the wall.
5. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a *fire door assembly* in a *fire barrier* separating an enclosure for *exit access stairways* and *ramps*, and *interior exit stairways* and *ramps* from an *exit passageway* in accordance with Section 1023.3.1.

707.7 Penetrations. Penetrations of *fire barriers* shall comply with Section 714.

Revise as follows:

707.7.1 Prohibited penetrations. Penetrations into enclosures for *shafts* ~~*exit access stairways* and *ramps*~~, *interior exit stairways* and *ramps*, and *exit passageways* shall be allowed only where permitted by Sections 713.8.1 ~~1019~~, 1023.5 and 1024.6, respectively.

Reason: This proposal corrects references to other sections that have additional requirements for fire barrier openings and penetrations. These sections currently refer to Section 1019 for exit access stairways and ramps, but Section 1019 has no information for openings and penetrations so these references are deleted. References are added for shaft enclosures that have additional requirements for openings and penetrations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects references to other sections that serve as pointers. Since compliance with these other sections is required regardless of pointers to these sections, there is no change to code requiriements and no change in the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee determined this proposal clarifies the current text. (Vote: 12-1)

Final Hearing Results

FS40-21	AS

FS41-21

Original Proposal

IBC: 707.6
Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

707.6 Openings. Openings in a *fire barrier* shall be protected in accordance with Section 716. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet (15 m^2). Openings in enclosures for *exit access stairways* and *ramps*, *interior exit stairways* and *ramps* and *exit passageways* shall also comply with Sections 1019, 1023.4 and 1024.5, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a *fire door* serving enclosures for *exit access stairways* and *ramps,* and *interior exit stairways* and *ramps.*
3. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective has been tested in accordance with ASTM E119 or UL 263 and has a minimum *fire-resistance rating* not less than the *fire-resistance rating* of the wall.
4. *Fire window assemblies* permitted in *atrium* separation walls shall not be limited to a maximum aggregate width of 25 percent of the length of the wall.
5. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a *fire door assembly* in a *fire barrier* separating an enclosure for *exit access stairways* and *ramps*, and *interior exit stairways* and *ramps* from an *exit passageway* in accordance with Section 1023.3.1.
6. <u>Openings providing entrance to an elevator car shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door assembly in a fire barrier that is an elevator hoistway enclosure.</u>

Reason: The doors to the elevator in an elevator shaft are limited by the size of the associated cab and addressed by the safety standards in ASME A17.1. The size of the shaft is determined by the car size and the number of cars. While this size and length limitation is a literal requirement in fire barriers, it is not typically applied to elevator shafts.

This proposal is submitted by the the ICC Fire Code Action Committee (FCAC).
ICC Building Code Action Committee (BCAC) worked with the FCAC to develop this proposal.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of existing criteria. This limitation was not typically applied to elevator shafts.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason:

The committee based their approval on the proponent's reason statement and concluded the code change clarifies existing criteria for doors to the elevator in an elevator shaft that needs to be limited by the size of the associated cab and addressed by the safety standards in ASME A17.1. (Vote: 13-0)

Final Hearing Results

FS41-21	AS

FS42-21

Original Proposal

IBC: 707.6

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

707.6 Openings. Openings in a *fire barrier* shall be protected in accordance with Section 716. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet (15 m^2). Openings in enclosures for *exit access stairways* and *ramps*, *interior exit stairways* and *ramps* and *exit passageways* shall also comply with Sections 1019, 1023.4 and 1024.5, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a *fire door* serving enclosures for *exit access stairways* and *ramps,* and *interior exit stairways* and *ramps.*
3. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective has been tested in accordance with ASTM E119 or UL 263 and has a minimum *fire-resistance rating* not less than the *fire-resistance rating* of the wall.
4. *Fire window assemblies* permitted in *atrium* separation walls shall not be limited to a maximum aggregate width of 25 percent of the length of the wall.
5. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a *fire door assembly* in a *fire barrier* separating an enclosure for *exit access stairways* and *ramps*, and *interior exit stairways* and *ramps* from an *exit passageway* in accordance with Section 1023.3.1.
6. <u>Openings shall not be limited to an aggregate width of 25 percent of the length of the wall where opening serves a *shaft enclosure* in accordance with Section 713</u>.
7. <u>Openings shall not be limited to an aggregate width of 25 percent of the length of the wall where opening serves a chute access room in accordance with Section 713.13.3 or a chute discharge room in accordance with Section 713.13.4.</u>

Reason: This proposal adds two new exceptions to the 25% length limitation for fire barrier openings. This section already includes Exceptions 2 and 5 for openings into stair, ramp and exit passageway enclosures where it is not practical to meet this length limitation since the door opening typically takes up well over 25% of the length of the wall. The two new exceptions are proposed for the same reason - it is simply not practical to meet this length limitation. Exception 6 is for shaft enclosures where door openings typically exceed 25% of the length of a wall - consider elevator doors or shaft access doors that take up nearly the entire length of the wall. Exception 7 is for chute access rooms and discharge rooms. Chute access rooms are typically very small rooms and it is not practical to meet the 25% limitation for the door into these rooms without oversizing the room. Chute discharge rooms often have a large door opening to allow passage of trash or recycling dumpsters and it is not practical to meet the 25% limitation without oversizing the room.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Due to impracticality of meeting the the 25% length limitation for shafts, chute access rooms and chute discharge rooms, it is believed that this requirement is typically not enforced so this proposal would not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this code change reflects the common practice in review and construction with little or no reports of safety issues. (Vote: 13-0)

Final Hearing Results

FS42-21	AS

FS43-21

Original Proposal

IBC: 707.8

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

707.8 Joints. *Joints* made in or between *fire barriers*, and *joints* made at the intersection of *fire barriers* with the underside of a fire-resistance-rated floor or roof sheathing, slab or deck above, and ~~the exterior vertical wall intersection~~ with other fire-resistance-rated wall assemblies ~~intersection~~ shall comply with Section 715.

Reason: This proposal clarifies that the joint requirements apply to the intersection of fire barriers and other fire-resistance-rated wall assemblies (e.g. a smoke barrier wall) and not solely to exterior wall assemblies. As revised this Section addresses just fire-resistance-rated walls. Intersections with nonfire-resistance-rated wall assemblies are covered in Section 707.9.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal simply clarifies joint protection requirements already stated in Section 715.3.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal clarifies the intersection of the exterior wall with other fire-resistance-rated wall assemblies. (Vote: 11-2)

Final Hearing Results

FS43-21	AS

FS44-21

Original Proposal

IBC: 707.9, 715.6 (New)

Proponents: Richard Walke, Creative Technology Inc., Creative Technology Inc. (RichWalke61@gmail.com)

2021 International Building Code

Revise as follows:

707.9 Voids at intersections. The voids created at the intersection of a *fire barrier* and a nonfire-resistance-rated *roof assembly* or a nonfire-resistance-rated *exterior wall* assembly shall ~~be filled. An *approved* material or system shall be used to fill the void, and shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.~~comply with Section 715.

Add new text as follows:

715.6 Fire barrier/nonfire-resistance-rated roof assembly intersections. Voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an approved material or system to retard the passage of fire and hot gases.

Reason: This proposal makes the following editorial changes:

1. It moves the details on how to protect the voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof assembly from Section 707.9 to new Section 715.6 where it more appropriately belongs.
2. It removes redundant language that is already covered in Section 715.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change the cost of construction as the changes are editorial and do not add new construction requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

715.7Exterior wall/vertical fire barrier intersections.
Voids created at the intersection of nonfire-resistance-rated exteriorwall assemblies and vertical *fire barriers* shall be filled with an *approved* material or system to retard the interior spread of fire and hot gases.

Committee Reason: The committee concluded the modification is necessary to keep the intent of the original code text intact. As modified, the proposal removes redundant language. It also relocates the details on protecting the voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof assembly to a more appropriate new section. (Vote: 13-0)

Final Hearing Results

FS44-21	AM

FS45-21

Original Proposal

IBC: SECTION 202 (New), SECTION 202, 707.9, 715.2, 715.6 (New), ASTM Chapter 35 (New)

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Add new definition as follows:

<u>CONTINUITY HEAD-OF-WALL JOINT SYSTEM</u>

.

<u>An assemblage of specific materials or products that are designed to resist the passage of fire through voids created at the intersection of fire barriers and the underside of nonfire-resistance-rated roof assemblies for a prescribed period of time.</u>

Revise as follows:

[BF] F RATING.
The time period that the *through-penetration firestop system,* ~~or~~ *perimeter fire containment system* <u>or</u> *<u>continuity head-of-wall joint system</u>* limits the spread of fire through the penetration or void.

[BF] T RATING.
The time period that the *penetration firestop system*, including the penetrating item, <u>or</u> *<u>continuity head-of-wall joint system</u>* limits the maximum temperature rise to 325°F (~~163~~<u>181</u>°C) above its initial temperature through the penetration <u>or void</u> on the nonfire side ~~when tested in accordance with ASTM E814 or UL 1479~~.

707.9 Voids at intersections. The voids created at the intersection of a *fire barrier* and a nonfire-resistance-rated *roof assembly* or a nonfire-resistance-rated *exterior wall* assembly shall ~~be filled. An *approved* material or system shall be used to fill the void, and shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases~~<u>comply with Section 715</u>.

715.2 Installation. Systems or materials protecting *joints* and voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the *joint* or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases. *Fire-resistant joint systems,* ~~or~~ systems used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections<u>, and</u> *<u>continuity head-of-wall joint systems</u>* shall also be installed in accordance with the listing criteria.

Add new text as follows:

<u>715.6 Fire barriers/nonfire-resistance-rated roof assembly intersections</u>. <u>Voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an approved material to retard the passage of fire and hot gases, or shall be protected by an approved continuity head-of-wall joint system tested in accordance with ASTM E2837 to provide an F rating/T rating for a time period not less than the required fire-resistance rating of the fire barrier in which it is installed.</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>E2837-2013 (2017)</u>	<u>Standard Test Method for Determining the Fire Resistance of Continuity Head-of- Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies</u>

Reason: This proposal revises the requirements for protecting voids at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof assembly as follows:
A. It moves the details on how to protect this void from Section 707.9 to new Section 715.6, leaving Section 707.9 as simply a pointer to Section 715.

B. The phrase relating to installation in a manner "so as not to dislodge, loosen or otherwise impair its ability to accommodated expected building movement" is not necessary in new Section 715.6 as it has been incorporated into Section 715.2 of the 2021 IBC.

C. New Section 715.6 includes an OPTION for protecting this void with a tested continuity head-of-wall joint system, without changing the current protection option. The use of a continuity head-of-wall joint system provides a simpler method for code compliance and enforcement as the system defines the materials necessary and the installation details.

D. A definition of continuity head-of-wall joint system is provided.

E. The definition of F rating is being revised to add continuity head-of-wall joint systems.

F. The definition of T rating is being revised to add reference continuity head-of-wall joint systems. In addition, it is being revised to remove reference to the two firestop test standards. Because these two firestop test standards were similarly removed from the definition of the F rating during the last code cycle, this change provides further consistency.

G. ASTM E2837 is being added as new referenced standard.There are currently over 20 continuity head-of-wall joint system tested and certified by UL.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not increase construction cost as it simply makes some editorial changes and offers an additional option to install a tested continuity head-of-wall joint system.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: CONTINUITY HEAD-OF-WALL ~~JOINT~~ SYSTEM. An assemblage of specific materials or products that are designed to resist the passage of fire through voids created at the intersection of *fire barriers* and the underside of nonfire-resistance-rated *roof assemblies* for a prescribed period of time.
[BF] F RATING. The time period that the *through-penetration firestop system, perimeter fire containment system* or *continuity head-of-wall ~~joint~~ system* limits the spread of fire through the penetration or void.
[BF] T RATING. The time period that the *penetration firestop system*, including the penetrating item, or *continuity head-of-wall ~~joint~~ system* limits the maximum temperature rise to 325°F (181°C) above its initial temperature through the penetration or void on the nonfire side.

715.2Installation.
Systems or materials protecting *joints* and voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the *joint* or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases. *Fire-resistant joint systems,* systems used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections, and *continuity head-of-wall ~~joint~~ systems* shall also be installed in accordance with the

listing criteria.

715.6Fire barriers/nonfire-resistance-rated roof assembly intersections.
Voids created at the intersection of a *fire barrier* and the underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an *approved* material to retard the passage of fire and hot gases, or shall be protected by an *approved continuity head-of-wall ~~joint~~ system* tested in accordance with ASTM E2837 to provide an *F rating*/*T rating* for a time period not less than the required *fire-resistance rating* of the *fire barrier* in which it is installed.

Committee Reason: The committee concluded the modification enhances the proposed text by removing the word joint from the continuity head-of-wall system. The proposal removes redundant language and gives another option for voids to be protected by an approved continuity head-of-wall joint system tested in accordance with ASTM E2837 to provide an F rating/T rating. (Vote: 8-5)

Final Hearing Results

FS45-21	AM

FS47-21 Part I

Original Proposal

IBC: 708.4.2, 713.11, 718.1, 718.3, 718.3.1, 718.4, 718.4.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

THIS IS A 4 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY CODE COMMITEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE MECHANICAL CODE COMMITEE. PART IV WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

708.4.2 Fireblocks and draftstops in combustible construction. In combustible construction where *fire partitions* do not extend to the underside of the floor or roof sheathing, deck or slab above, the space above and along the line of the *fire partition* shall be provided with one of the following:

1. *Fireblocking* up to the underside of the floor or roof sheathing, deck or slab above using materials complying with Section 718.2.1.
2. ~~Draftstopping~~ *Draftstops* up to the underside of the floor or roof sheathing, deck or slab above using materials complying with Section 718.3.1 for floors or Section 718.4.1 for *attics*.

Exceptions:

1. Buildings equipped with an *automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1, or in accordance with Section 903.3.1.2 provided that protection is provided in the space between the top of the *fire partition* and underside of the floor or roof sheathing, deck or slab above as required for systems complying with Section 903.3.1.1.
2. Where *corridor* walls provide a *sleeping unit* or *dwelling unit* separation, ~~draftstopping~~ *draftstops* shall only be required above one of the *corridor* walls.
3. In Group R-2 occupancies with fewer than four *dwelling units*, *fireblocking* and ~~draftstopping~~ *draftstops* shall not be required.
4. In Group R-2 occupancies up to and including four *stories* in height in buildings not exceeding 60 feet (18 288 mm) in height above *grade plane*, the *attic* space shall be subdivided by *draftstops* into areas not exceeding 3,000 square feet (279 m^2) or above every two *dwelling units*, whichever is smaller.
5. In Group R-3 occupancies with fewer than three *dwelling units, fireblocking* and ~~draftstopping~~ *draftstops* shall not be required in floor assemblies.

713.11 Enclosure at the bottom. *Shafts* that do not extend to the bottom of the building or structure shall comply with one of the following:

1. Be enclosed at the lowest level with construction of the same *fire-resistance rating* as the *lowest floor* through which the *shaft* passes, but not less than the rating required for the *shaft enclosure.*
2. Terminate in a room having a use related to the purpose of the *shaft*. The room shall be separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* and opening protectives shall be not less than the protection required for the *shaft enclosure*.
3. Be protected by *approved fire dampers* installed in accordance with their listing at the *lowest floor* level within the *shaft enclosure*.

Exceptions:

1. The fire-resistance-rated room separation is not required, provided that the only openings in or penetrations of the *shaft enclosure* to the interior of the building occur at the bottom. The bottom of the *shaft* shall be closed off around the penetrating items with materials permitted by Section 718.3.1 for ~~draftstopping~~ *draftstops*, or the room shall be provided with an *approved automatic sprinkler system*.
2. A *shaft enclosure* containing a waste or linen chute shall not be used for any other purpose and shall discharge in a room protected in accordance with Section 713.13.4.
3. The fire-resistance-rated room separation and the protection at the bottom of the *shaft* are not required provided that there are no combustibles in the *shaft* and there are no openings or other penetrations through the *shaft enclosure* to the interior of the building.

718.1 General. *Fireblocking* and ~~draftstopping~~ *draftstops* shall be installed in combustible concealed locations in accordance with this section. *Fireblocking* shall comply with Section 718.2. ~~Draftstopping~~ *draftstops* in floor/ceiling spaces and attic spaces shall comply with Sections 718.3 and 718.4, respectively. The permitted use of combustible materials in concealed spaces of buildings of Type I or II construction shall be limited to the applications indicated in Section 718.5.

718.3 ~~Draftstopping~~ Draftstops in floors. ~~Draftstopping~~ *draftstops* shall be installed to subdivide floor/ceiling assemblies where required by Section 708.4.2. In other than Group R occupancies, ~~draftstopping~~ *draftstops* shall be installed to subdivide combustible floor/ceiling assemblies so that horizontal floor areas do not exceed 1,000 square feet (93 m^2).

Exception: Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

718.3.1 ~~Draftstopping~~ *Draftstop* materials. ~~Draftstopping~~ *Draftstop* materials shall be not less than $^1/_2$-inch (12.7 mm) *gypsum board,* $^3/_8$-inch (9.5 mm) *wood structural panel*, $^3/_8$-inch (9.5 mm) *particleboard,* 1-inch (25-mm) nominal lumber, cement *fiberboard*, batts or blankets of mineral wool or glass fiber, or other *approved* materials adequately supported. The integrity of *draftstops* shall be maintained.

718.4 ~~Draftstopping~~ Draftstops in attics. ~~Draftstopping~~ *Draftstops* shall be installed to subdivide *attic* spaces where required by Section 708.4.2. In other than Group R, ~~draftstopping~~ *draftstops* shall be installed to subdivide combustible *attic* spaces and combustible concealed roof spaces such that any horizontal area does not exceed 3,000 square feet (279 m^2). *Ventilation* of concealed roof spaces shall be maintained in accordance with Section 1202.2.1.

Exception: Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

718.4.1 ~~Draftstopping~~ Draftstop materials. Materials utilized for ~~draftstopping~~ *draftstops* of *attic* spaces shall comply with Section 718.3.1.

Reason: This is an editorial change. The word draftstopping is used multiple times throughout the IBC, IFC, IMC and IPC. This term is used with no definition. However, the term draftstop is a defined term in the IBC and IFC. These are the same terms. This development replaces all occurrences of draftstopping with the defined term of draftstop. Additionally, this development inserts the definition for draftstop into the IMC and IPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal is an editorial change to correct the code text by using draftstops instead of draftstopping. (Vote: 11-2)

Final Hearing Results

FS47-21 Part I AS

FS47-21 Part II

Original Proposal

IFC: 707.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis.andrew1988@gmail.com); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Fire Code

Revise as follows:

707.1 Fireblocking and ~~draftstopping~~ draftstops. Required *fireblocking* and ~~*draftstopping*~~ draftstops in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

Reason: This is an editorial change. The word draftstopping is used multiple times throughout the IBC, IFC, IMC and IPC. This term is used with no definition. However, the term draftstop is a defined term in the IBC and IFC. These are the same terms. This development replaces all occurrences of draftstopping with the defined term of draftstop. Additionally, this development inserts the definition for draftstop into the IMC and IPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal revises the current language to the proper terminology that is used in the code. (Vote: 14-0)

Final Hearing Results

FS47-21 Part II	AS

FS47-21 Part III

Original Proposal

IMC: SECTION 202 (New), 504.2

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis.andrew1988@gmail.com); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Mechanical Code

Add new definition as follows:

<u>DRAFTSTOP</u>

.

<u>A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and attics.</u>

Revise as follows:

504.2 Exhaust penetrations. Where a clothes dryer exhaust duct penetrates a wall or ceiling membrane, the annular space shall be sealed with noncombustible material, *approved* fire caulking or a noncombustible dryer exhaust duct wall receptacle. Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, ~~draftstopping~~ <u>*draftstops*</u> or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating is maintained in accordance with the *International Building Code* . Fire dampers, combination fire/smoke dampers and any similar devices that will obstruct the exhaust flow shall be prohibited in clothes dryer exhaust ducts.

Reason: This is an editorial change. The word draftstopping is used multiple times throughout the IBC, IFC, IMC and IPC. This term is used with no definition. However, the term draftstop is a defined term in the IBC and IFC. These are the same terms. This development replaces all occurrences of draftstopping with the defined term of draftstop. Additionally, this development inserts the definition for draftstop into the IMC and IPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee all agree that the term "draftstop" is a more appropriate term than "draftstopping".The word draftstopping is used multiple times throughout the IBC, IFC, IMC and IPC. This term is used with no definition. However, the term draftstop is a defined term in the IBC and IFC. These are the same terms. This proposal replaces all occurrences of draftstopping with the defined term of draftstop. Additionally, this proposal inserts the definition for draftstop into the IMC and IPC. (Vote: 11-0)

Final Hearing Results

FS47-21 Part III	AS

FS48-21

Original Proposal

IBC: 709.5

Proponents: John Woestman, Kellen Company, Codes Director, Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Revise as follows:

709.5 Openings. Openings in a *smoke barrier* shall be protected in accordance with Section 716.

Exceptions:

1. In Group I-1, Condition 2, Group I-2 and*ambulatory care facilities*, where a pair of opposite-swinging doors are installed across a corridor in accordance with Section 709.5.1, the doors shall not be required to be protected in accordance with Section 716. The doors shall be close fitting within operational tolerances, and shall not have a center mullion or undercuts in excess of $^3/_4$ inch (19.1 mm), louvers or grilles. The doors shall have head and jamb stops, and astragals or rabbets at meeting edges. ~~Where permitted by the door manufacturer's listing, positive-latching devices are not required.~~ Factory-applied or field-applied protective plates are not required to be labeled.
2. In Group I-1, Condition 2, Group I-2 and*ambulatory care facilities*, special purpose horizontal sliding, accordion or folding doors installed in accordance with Section 1010.3.3 and protected in accordance with Section 716.

Reason: These cross corridor doors do not require a manufacturer's listing, so this sentence is confusing. Thus, the first part of the sentence should be deleted.
Also, doors required to comply with Section 716 are required to be positive latching. But, these cross corridors are explicitly not required to comply with Section 716. Thus, the requirement to be positive latching should also be deleted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Deleting this sentence cleans up an internal conflict in the code.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

709.5 Openings.
Openings in a *smoke barrier* shall be protected in accordance with Section 716.

Exceptions:

1. In Group I-1, Condition 2, Group I-2 and*ambulatory care facilities*, where a pair of opposite-swinging doors are installed across a corridor in accordance with Section 709.5.1, the doors shall not be required to be protected in accordance with Section 716. The doors shall be close fitting within operational tolerances, and shall not have a center mullion or undercuts in excess of $^3/_4$ inch (19.1 mm), louvers or grilles. The doors shall have head and jamb stops, and astragals or rabbets at meeting edges. <u>Positive latching devices are not required</u>. Factory-applied or field-applied protective plates are not required to be labeled.
2. In Group I-1, Condition 2, Group I-2 and*ambulatory care facilities*, special purpose horizontal sliding, accordion or folding doors installed in accordance with Section 1010.3.3 and protected in accordance with Section 716.

Committee Reason: The committee determined the modification is consistent with CMS (Centers for Medicare and Medicaid Services) regulation. The committee approved the deletions of the first part of the sentence since these cross corridor doors do not require a manufacturer's listing, so this sentence is confusing. The committee mentioned this proposal conflicts with section 909.5.3. Section 909.5.3 opening protection, exception #3 still states, "where permitted by the door manufacturer’s listing, positive-latching devices are not required" that need to be fixed in the public comment phase. (Vote: 13-0)

Final Hearing Results

FS48-21	AM

FS49-21

Original Proposal

IBC: 710.4

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

Revise as follows:

710.4 Continuity. *Smoke partitions* shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

<u>**Exception:** In Group I-2, a lay-in ceiling system shall be considered capable of limiting the transfer of smoke where the ceiling tiles that weigh a minimum of one pound per square foot and where the HVAC system is fully ducted in accordance with Section 603 of the *International Mechanical Code.*</u>

Reason: Current interpretation of an allowable ceiling system is to be "monolithic." This type of ceiling is not feasible in a hospital setting, because main utility and ductwork lines run in the corridor to keep them out of patient care areas. This would facilitate the need for many access panels which compromise the smoke tight nature of the monolithic ceiling. The construction of the lay-in system would basically mean no open portions or gaps in the ceiling, either as an architectural feature or between items such as louvers. Normal ceiling fixtures such as lights, sprinkler heads, and diffusers and grills (as part of a fully ducted air system) can be considered part of the smoke tight system, as there is no opportunity for smoke to travel straight through them. A tight fitting lay-in grid is defined as one with no gaps in them, which is easily enforced via visual inspection and is therefore simply maintained.
Group I-2 is being specified, to make clear that this allowance applies to nursing homes (Condition 1) and hospitals (Condition 2), which is consistent with federal standards.

Lay in ceiling assemblies meeting this requirement would be consistent with listed fire resistance rated floor and roof ceiling assemblies using lay-in ceilings as a component of the assembly. Enforcement of this provision including fire code maintenance inspections would be far less challenging than currently exists for the fire-resistance rated floor- and roof-ceiling assemblies which require a specific manufacture's product for each of the assemblies that are listed by an approved testing facility. This proposal would allow any manufacturer's product to be used as long as it met the 1 pound per square foot criteria and other code requirements related to combustibility or flame spread. This is also supported by UL's BXUV Guide Information - Fire Resistance Ratings - ANSI/UL 263, Section III - FLOOR-CEILINGS AND ROOF-CEILINGS, Paragraph 10 which states "Hold down clips are required for assemblies incorporating ceiling panels weighing less that 1 lb per square foot."

As noted in past studies, the ceiling tile weight is also consistent with the findings of NBSIR 81-2444 Smoke Movement Through A Suspended Ceiling System (by John H Klote, 1982, NBS/VA), as noted on page 4 which states "[t]he ceiling tiles weighed 49.6 N/m2 (1.00 lb/ft2). During plan review, a cut sheet of the desired ceiling tile (readily available from any manufacturer) can be included in the review package or the one pound per square foot criteria can be listed in the specifications. The NBSIR 81-2444 report also notes in its abstract and conclusions that "smoldering fires of the type examined in this test series are not significant problems in hospitals." This is even more true today because of the expanded use of non combustible materials in construction as well as bedding and other typically used items in the hospital.

In terms of enforcement, hospitals have maintenance teams that are tasked with performing preventative maintenance and timely repairs as not to compromise the environment of care. Also, each hospital has personnel resources that deal specifically with regulatory issues. This regulatory staff has many regulations that deal with direct patient care, but they also help monitor the environment of care. There is also Infection Prevention professionals that Multidisciplinary teams regularly round in the hospital, reviewing delivery of care and the condition of the built environment. The multidisciplinary rounding team typically consists of representatives from Facilities, Regulatory, Infection Prevention, and leadership from the nursing care team. The status of a ceiling system is a key element that is observed to maintain its integrity.

A ceiling's role is a component of the life safety system of the hospital, by way of the relationship to activation of sprinkler heads and control of smoke. With the exception of mechanical rooms, all spaces in a patient care area have ceilings as part of the life safety system of the hospital, in particular the corridor. it is also a key component of the infection prevention elements of the hospital. These are some elements that Infection Prevention professionals focus on for the integrity of the ceiling:

· Minimize dust and particulates to enter patient care environments, including corridors, patient rooms, procedure rooms, storage rooms of medical supply, clean utility rooms, among others.

· Contribute to the air pressure relationships provided for each room. For example, negative pressure patient bed rooms to treat patients with infectious diseases.

When monitoring the integrity of the ceiling, missing or cracked tiles are a main area of focus, and are easily seen by all staff. The replacement of a ceiling tile is a top priority of a hospital maintenance department. This information is also tracked by the agencies that regulate hospitals, including Centers for Medicare and Medicaid Services (CMS), and deemed authorities including The Joint Commission (TJC). According to TJC, in 2009, citations in the Life Safety portion of surveys that involved ceilings ranked #2 in 2009. In 2019, this citation rank fell to #6. This demonstrates the focus on the issue, even when the criteria for a citation can be the smallest scratch, or stain from a water leak, much less the more obvious missing or tile with a corner out or other damage.

This code change proposal is a key element of compliance with the federal standards that are enforced for I-2 occupancies, and are important to be aligned with those standards.

Also limiting the HVAC system to ducted systems will preclude the possibility of an open plenum return system. Plenum systems are generally not used in hospitals due to the required pressure relationships foe infection prevention considerations and to maintain more accurate control of the temperature and humidity control.

Corridor walls are built to structure in most cases based on FGI (acoustic requirements), however, having to access the above ceiling space for inspection and maintenance causes issues with infection control, whereas maintaining a suspended acoustic ceiling to limit the transfer of smoke is visible and easily maintained and as noted above, is being done as part of infection control procedures with the interdisciplinary team.

This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This represents current common practice in Group I-2 facilities.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal clarifies the limitation of the transfer of smoke in Group I-2. (Vote: 11-2)

Final Hearing Results

FS49-21 AS

FS51-21

Original Proposal

IBC: 712.1.3.2

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

712.1.3.2 Automatic shutters. Protection of the vertical opening by *listed* or *approved* shutters at every penetrated floor shall be permitted in accordance with this section. The shutters shall be installed in accordance with the manufacturer's instructions.The shutters shall be of noncombustible construction and have a *fire-resistance rating* of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3.1 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release therefrom.

Reason: This proposal requires the shutters used to protect escalator openings to be*listed* or *approved*, rather rather than just approved. It also requires them to be installed in accordance with the manufacturer's instructions.
There is currently a product available which is being marketed to meet this code provision, and is*listed* in a manner consistent with this proposal.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase construction cost but instead will now recognize both listed or approved shutters.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee objects to adding "listed or" in section 712.1.3.2, while it is not prohibited in the section. The proposal could be confusing by requiring listed as an alternative to "approved". The committee also disagrees with the cost impact statement since the proposal will increase the cost of construction. (Vote: 8-5)

Public Comments

Public Comment 1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org) requests As Submitted

Commenter's Reason: This public comment is asking that this proposal be approved as submitted (AS). The committee was concerned that the language should say "listed and approved." However, the listed products are fairly limited at this time and requiring "listed or aproved" provides flexibility and would not increase the cost of applying the code.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The 2021 IBC only requires they be approved. This proposal and PC simply provides more flexibility. The revised code text recognizes that there are some listed products available but would not be limited to listed products.

Final Hearing Results

FS51-21	AS

FS53-21

Original Proposal

IBC: 712.1.3.2
Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

712.1.3.2 Automatic shutters. Protection of the vertical opening by approved shutters at every penetrated floor shall be permitted in accordance with~~this section.~~all of the following:

1. The ~~shutters~~shutter shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours.
2. The shutter shall ~~be so constructed as to~~ close immediately upon the actuation of a smoke detector installed in accordance with Section ~~907.3.1 and~~ 907.3.
3. The shutter shall completely ~~shut~~ close off the ~~well~~ vertical opening.
4. Escalators shall cease operation when the shutter begins to close.
5. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s)~~and.~~
6. The shutter shall be equipped with a~~sensitive~~ sensing leading edge to ~~arrest its progress~~ stop closure where in contact with any obstacle, and ~~to~~ continue ~~its progress on release therefrom~~ to close when the obstacle is cleared.

Reason: The FCAC has several proposals to this section that all work together. However, disapproval of any of the proposals will not jeopardize the remaining proposals. This proposal reformats Section 712.1.3.2 into a “bullet point” format and includes minor technical and editorial changes.

The reference change from 907.3.1 to 907.3, for smoke activated devices is consistent with similar references in Sections 716.2.6.6 and 717.3.3.2.

The change to sensing leading edge reflects the commonly used industry term.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change to construction cost as this proposal is primarily an editorial reformatting. The changes do not mandate anything new which increases the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposed change is editorial and is a good clarification of the code requirements.

(Vote: 13-0)

Final Hearing Results

FS53-21	AS

FS55-21

Original Proposal

IBC: 713.4

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Building Code

Revise as follows:

713.4 Fire-resistance rating. *Shaft enclosures* shall have a *fire-resistance rating* of not less than 2 hours where connecting four*stories* or more, and not less than 1 hour where connecting less than four *stories*. The number of *stories* connected by the *shaft enclosure* shall include any *basements* but not any *mezzanines*. *Shaft enclosures* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. *Shaft enclosures* shall meet the requirements of Section 703.2.1.1.

Exception: Shafts permitted to have their fire-resistance rating reduced in high-rise buildings in accordance with Section 403.2.1.2.

Reason: The intent of this proposal is to provide a cross reference back to the high-rise provisions Section 403.2.1.2 permits the rating of a shaft to be reduced by one-hour. Therefore, there is a conflict between that section and Section 713.4. This improves the language since it clarifies the intent of the provisions and makes the language correct in the application. I also eliminates the conflict between the two sections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the is proposal is to clarify the language and provide a cross reference.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee concluded adding the exception is a helpful pointer back to the high-rise provisions; section 403.2.1.2 permits the fire-resistance rating of a shaft to be reduced. (Vote: 8-5)

Final Hearing Results

FS55-21	AS

FS57-21

Original Proposal

IBC: 713.13.4

Proponents: Eric Bressman, Ankrom Moisan Architects, Ankrom Moisan Architects (ericb@ankrommoisan.com)

2021 International Building Code

Revise as follows:

713.13.4 Chute discharge room. Table 509.1Waste, recycling or linen chutes shall discharge into an enclosed room separated by *fire barriers* with a *fire-resistance rating* not less than the required fire rating of the*shaft enclosure* and constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. Openings into the discharge room from the remainder of the building shall be protected by opening protectives having a *fire protection rating* ~~equal to~~ <u>based on</u> the ~~protection required for~~ <u>fire rating of</u> the *shaft enclosure* <u>in accordance with Tables 716.1(2) and 716.1(3</u>). Doors shall be self- or automatic-closing upon the detection of smoke in accordance with Section 716.2.6.6. Waste chutes shall not terminate in an incinerator room. Waste and linen rooms that are not provided with chutes need only comply with Table 509.1.

Reason: The current language is confusing to both designers and building officials. It implies that openings into a termination room have to carry the same rating as the walls of the shaft, either 60 or 120 minutes. This is not the case, but the use of the words 'equal to' implies that it is. There could be no reference at all to the doors, and the requirements would be clearer than they are now since users would refer to Sections 707 for the design of the fire barriers and 716 for the associated opening protection requirements. The only places the Code references specific opening requirements for walls, is when they are not in alignment with Tables 716.1(2) and 716.1(3). An example of this is Section 3007.6.3, doorways into Fire Service Access Elevator lobbies. These lobbies have 1-hour smoke barrier walls around them, but require 45 minute rated doors. This is an exception to the typical 1-hour smoke barrier which would only carry a 20 minute requirement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the existing requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal is in line with the opening protective in Tables 716.1(2) and 716.1(3). (Vote: 13-0)

Final Hearing Results

FS57-21	AS

FS60-21

Original Proposal

IBC: 714.3

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors Association International (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

714.3 Sleeves. Where sleeves are used, they shall be~~securely fastened to the assembly penetrated~~installed in accordance with manufacturer's installation instructions and the listing criteria for the listed system. Where listed systems are not used, sleeves shall be securely fastened to the assembly penetrated. The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

Reason: Currently, sleeve installation details are only described generically in this section. The listing needs to be the guiding document for sleeve installations with firestop systems. Not all sleeves are required by the listing to be securely fastened to the assembly. In fact, some listings state fastening is not required. This change allows the instructions shown in the listing to take precedence, where it is part of the listing criteria. If the system is not a listed system, the sleeves shall be securely attached to the assembly penetrated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed language is consistent with current construction practice.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal clarifies the current language for sleeves. The committee advised the proponent to clarify the second sentence of the proposal in the public comment phase. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors Association International (wkoffel@koffel.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

714.3 Sleeves . Where sleeves are used, they shall be~~installed~~ securely fastened to the assembly penetrated and installed in accordance with the sleeve manufacturer's installation instructions. ~~and the~~ Where listed systems are used, the sleeve shall be installed in accordance with the listing criteria for the~~ listed~~ system. ~~Where listed systems are not used, sleeves shall be securely fastened to the assembly penetrated..~~ The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

Commenter's Reason: Although the Committee approved FS60-21 As Submitted, the Committee did note that the second sentence needed to be clarified during the Public Comment period. The Public Comment attempts to clarify the requirements be resequencing some of the language, as recommended by at least one Committee member.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Editorial clarification.

Final Hearing Results

FS60-21	AMPC1

FS64-21

Original Proposal

IBC: 714.5, 714.5.1

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

714.5 Horizontal assemblies. Penetrations of a *fire-resistance-rated* floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a *shaft* by Section 712.1 shall be protected in accordance with Sections 714.5.1 through 714.5.4.

Revise as follows:

714.5.1 Through penetrations. *Through penetrations* of *horizontal assemblies* shall comply with Section 714.5.1.1 or 714.5.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or masonry items through a single fire-resistance-rated floor assembly where the *annular space* is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided that the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided that the concrete, grout or *mortar* is installed the full thickness of the floor or the thickness required to maintain the *fire-resistance rating*. The penetrating items shall not be limited to the penetration of a single concrete floor, provided that the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.
4. <u>Penetrations of concrete floors or ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas.</u>

Reason: Section 712.1.10 currently permits unprotected vertical openings in parking garages for ramps, elevators and duct systems and Section 715.1 currently permits unprotected joints in floors and ramps within parking garages or structures. Based on these allowances, it goes to reason that penetrations through floors and ramps of parking garages should also be permitted to be unprotected. This proposal allows such unprotected penetrations but is limited to concrete floors and ramps since these unprotected penetrations do not compromise the fire-resistance rating of the floor, while an unprotected penetration through a floor/ceiling assembly would allow a fire enter the cavity of the assembly and compromise the fire-resistance rating. These unprotected penetrations are further limited to penetrations with parking above and below the penetration, which is consistent with 712.1.10 and 715.1 that allow vertical openings and joints "in" or "within" parking garages or structures - this also essentially prohibits concealed penetrations which could allow a fire through a penetration to go undetected for some period of time.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will allow unprotected penetrations in garages which will reduce the cost of construction due to a reduction in through-penetration firestop systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that this exception for "penetrations of concrete floors or ramps within parking garages or structures constructed per Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas" is common sense. (Vote: 10-3)

Final Hearing Results

FS64-21	AS

FS66-21

Original Proposal

IBC: 714.5.1.2

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

714.5.1.2 Through-penetration firestop system. *Through penetrations* shall be protected by an *approved through-penetration firestop system* installed and tested in accordance with ASTM E814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (2.49 Pa). The system shall have an *F rating*/*T rating* of not less than 1 hour but not less than the required rating of the floor penetrated.

Exceptions:

1. Floor penetrations contained and located within the cavity of a wall above the floor or below the floor do not require a *T rating*.
2. Floor penetrations by floor drains, tub drains or shower drains contained and located within the concealed space of a *horizontal assembly* do not require a *T rating*.
3. Floor penetrations of maximum 4-inch (102 mm) nominal diameter metal conduit or tubing penetrating directly into metal-enclosed electrical power switchgear do not require a *T rating*.
4. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter do not require a T rating. These penetrating items shall not be limited to the penetration of a single concrete floor, provided the area of the opening through each floor does not exceed 144 square inches (92,900 mm^2).

Reason: This proposal provides consistency with the temperature rise criteria (T rating) between penetrations protected with tested and listed systems versus those protected with concrete, grout and mortar. The language in this proposal is identical to the wording used to protect these same penetrations using concrete, grout and mortar in Section 714.5.1, Exception 2.
The code is currently inconsistent in the application of temperature rise criteria for continuous metallic penetrants such as pipes and conduit penetrating fire separations. Penetrations protected with concrete, grout, or mortar are permitted without a T rating, but the same penetrations protected with tested and listed systems would require the T rating. There is no technical justification for such a distinction. If anything, the tested systems have been specifically evaluated and will reliably achieve the same or higher level of performance.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will decrease cost by expanding the exception and removing the need to insulate these penetrating items.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposed text is needed to provide consistency with the code language for continuous metallic penetrants. (Vote: 13-0)

Final Hearing Results	
FS66-21	AS

FS68-21

Original Proposal

IBC: 715.2

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

715.2 Installation. Systems or materials protecting *joints* and voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the *joint* or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases. *Fire-resistant joint systems* ~~or systems used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections~~ and *perimeter fire containment systems* shall also be installed in accordance with the listing criteria.

Reason: This is a clean up arising from changes in the last cycle. Proposal FS52-18 expanded on the installation requirements for joints and voids contained in Section 715.2, which included the "system used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections." Proposal FS53-18 introduced a new defined phrase "perimeter fire containment system" to describe the method of protecting this same void. Since these were two independent proposals, it was not possible to editorially combine the newly defined phrase "perimeter fire containment system" into the updated Section 715.2, covering Installation. This proposal is intended to do that, thereby simplifying Section 715.2.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The code change proposal will not increase the cost of construction. This change is editorial and does not add new construction requirements

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal is a good clarification of the current code text without technical changes. The proposal introduced a defined phrase, "perimeter fire containment system," to describe the method of protecting the same void in section 715.2. (Vote: 13-0)

Final Hearing Results

FS68-21 AS

FS70-21

Original Proposal

IBC: 715.2, 715.2.1 (New), 715.2.2 (New)

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors Association International (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

715.2 Installation. Systems or materials protecting joints and voids shall be installed in accordance with 715.2.1 and 715.2.2S~~. ystems or materials protecting *joints* and voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the *joint* or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases. *Fire-resistant joint systems* or systems used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections shall also be installed in accordance with the listing criteria.~~

Add new text as follows:

715.2.1 List system installation. Listed *fire-resistant joint systems* and perimeter fire containment systems shall be securely installed in accordance with the manufacturer's installation instructions and the listing criteria in or on the joint or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

715.2.2 Approved materials installation. Approved materials protecting voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

Reason: The 2018 Edition of the IBC had the language, 'installed in accordance with the listing criteria and the manufacturers installation instruction ... so as not to dislodge, loosen, or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gasses. The change in the 2021 Edition of the IBC has taken the installation sections out of the material and system requirements and put it in a consolidated installation section. While we agree with moving the language to the installation section, it seems that combining the 'materials' and 'systems' confuses when listings are needed and when manufacturers installation instructions are needed. To be crystal clear, we've broken the section into two sections:

1. Section requiring fire-resistive joint systems and perimeter fire containment systems
2. Section requiring materials and not systems.

Additionally, the listings do not always refer to the manufacturers installation instructions. Therefore, only having the word 'systems', does not connect the manufacturers installation instructions and listing criteria. This clarified section makes it clear what is required in each section of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is mostly editorial for clarification purposes and is consistent with current practice.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal clarifies the current text by dividing one paragraph into two subsections.

(Vote: 11-2)

Final Hearing Results

FS70-21 AS

FS75-21

Original Proposal

IBC: 715.4, 715.5

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

Exception: *Approved perimeter fire containment system* shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

715.5 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be filled with an *approved* material or system to retard the interior spread of fire and hot gases ~~between *stories*~~.

Exception: *Approved* material or system to retard the interior spread of fire and hot gases shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

Reason: Section 715.3 for fire-resistant joint systems includes exceptions for several types of floors, which essentially allows open joints between fire-resistant floors or floor/ceiling assemblies. This proposal extends exceptions that are applicable to curtain wall/floor intersections to the void at the curtain wall/floor intersection. If an an open joint within these floors is acceptable, it goes to reason that it is also acceptable to have an open void between these floors and exterior curtain wall. The exceptions for this condition include floors within a dwelling unit, floors and ramps in parking garages or structures, and mezzanine floors. An example of the use of these exceptions is a parking garage on the lower floors of a building that have exterior curtain walls to "hide" the garage to match the exterior appearance of the building above the garage levels. Also, in Section 715.5, the words "between stories" is proposed to be deleted to align the wording of this section with that of 715.4 and 715.3.

Cost Impact: The code change proposal will decrease the cost of construction
For certain conditions, this proposal will remove the requirement for approved systems at voids at curtain wall/floor intersections so the cost of construction will decrease.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement and concluded the code change clarifies existing criteria. The committee also mentioned that the relocation is necessary and practical. (Vote: 11-2)

Final Hearing Results

FS75-21	AS

FS76-21

Original Proposal

IBC: 715.6

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

715.6 Exterior ~~curtain~~ wall/vertical fire barrier intersections. Voids created at the intersection of nonfire-resistance-rated exterior ~~curtain~~ wall assemblies and vertical *fire barriers* shall be filled with an approved material or system to retard the interior spread of fire and hot gases.

Reason: This proposal clarifies that this section covers voids created with all non-fire-resistance-rated wall assemblies, not just non-fire-resistance-rated curtain wall assemblies.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase the cost of construction. The proposal simply clarifies the voids are to be protected.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded word "curtain" is not needed since the section addresses the intersection of an exterior wall with a vertical fire barrier. Although this code change has been approved, one committee member mentioned the proposal would contradict section 715.3, addressing fire-resistance-rated assembly intersections. (Vote: 9-4)

Final Hearing Results

FS76-21 AS

FS79-21

Original Proposal

IBC: 716.1.1

Proponents: William Koffel, Koffel Associates, Inc., Fire Safe North America (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

716.1.1 Alternative methods for determining fire protection ratings. The application of any of the alternative methods specified in this section shall be based on the fire exposure and acceptance criteria specified in NFPA 252, NFPA 257, UL 9, UL 10B or UL 10C. The required ~~*fire resistance*~~*fire protection rating* of an opening protective shall be permitted to be established by any of the following methods or procedures:

1. Designs documented in *approved* sources.
2. Calculations performed in an *approved* manner.
3. Engineering analysis based on a comparison of opening protective designs having *fire protection ratings* as determined by the test procedures set forth in NFPA 252, NFPA 257, UL 9, UL 10B or UL 10C.
4. Alternative protection methods as allowed by Section 104.11.

Reason: The paragraph currently uses the generic, defined term of "fire resistance." However, opening protectives are assigned a "fire protection rating." The test methods referenced in the paragraph are used to determine a "fire protection rating." The use of "fire resistance" causes confusion and people don't always understand the different performance characteristics associated with assemblies that have a "fire resistance rating" or a "fire protection rating."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed change simply clarifies the intent of existing code requirements. If anything, the cost of construction could be decreased by eliminating the confusion associated with the current code text.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this code change brings the proper terminology by replacing "fire resistance" with "fire protection rating". (Vote: 13-0)

Final Hearing Results

FS79-21	AS

FS80-21

Original Proposal

IBC: 716.1.1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

716.1.1 Alternative methods for determining fire protection ratings. The application of any of the alternative methods specified in this section shall be based on the fire exposure and acceptance criteria specified in NFPA 252, NFPA 257, UL 9, UL 10B or UL 10C. The required *fire resistance* of an opening protective shall be permitted to be established by any of the following methods or procedures:

1. Designs documented in *approved* sources.
2. ~~Calculations performed in an *approved* manner.~~

~~3~~ 2. Engineering analysis based on a comparison of opening protective designs having *fire protection ratings* as determined by the test procedures set forth in NFPA 252, NFPA 257, UL 9, UL 10B or UL 10C.

~~4~~ 3. Alternative protection methods as allowed by Section 104.11.

Reason: There are no approved calculation methods for open protectives, published by competent sources we are aware of, that would yield a reliable determination of fire protection ratings for an open protective. While thermal transfer rates can be calculated in assemblies the results do not yield an equivalent fire protection rating.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no known calculation methods that can be used.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval of deleting procedure #2 on the proponent's reason statement. There are no approved calculation methods for open protectives, published by competent sources. (Vote: 12-1)

Final Hearing Results

FS80-21 AS

FS84-21

Original Proposal

IBC: 716.2.2.1.1

Proponents: William Koffel, Koffel Associates, Inc., Fire Safe North America (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

716.2.2.1.1 Smoke and draft control. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot ($0.01524\ m^3/s \times m^2$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature and elevated temperature tests. Louvers shall be prohibited. *Terminated stops* shall be prohibited on doors required by Section 405.4.3 to comply with Section 716.2.2.1 and prohibited on doors required by Item 3 of Section 3006.3, or Section 3007.6.3 or 3008.6.3 to comply with this section.

Exception: Elevator hoistway door openings protected in accordance with Section 3006.3.

Reason: It is recognized that elevator doors themselves, at least current elevator door assemblies, are not able to meet the smoke- and draft-control assembly requirements. However, since its inception the IBC has required that such door openings into a fire resistance rated corridor or a smoke barrier meet smoke- and draft-control assembly requirements. This was clarified when Section 3006.2.1 was added to the 2018 Edition of the IBC, not as a new requirement; but rather as a clarification (G201-15). The Reason Statement for G201-15 read as follows:

Reason: During the 2012 cycle the CTC submitted a code change FS88-12 to clarify that it was not the intent to require protection of a hoistway opening in rated corridors. Instead, the elevator lobby requirements themselves addressed this issue. That proposal was not approved. Based upon that disapproval, it appears that it is within the intent to require protection of elevator hoistway openings based upon the requirement for rated corridor construction. Therefore, this requirement needs to be specifically clarified within Section 3006 to avoid the requirement being missed. A new section 3006.2.1 has been written to clarify that intent. Also, to further clarify this intent a Section 1020.1.1 has been provided as a pointer to these specific lobby requirements.

BCAC has submitted a proposal to delete Section 3006.2.1 and add the requirement to Section 3006.2. One of the supporting arguments offered by the proponents is that there is minimal stack effect in low-rise buildings. While there may be some truth to that statement, it fails to address the fact that the intent of the requirements in Chapters 7, 10, and 30 have been to also protected the corridor from a fire originating in the elevator hoistway. While most of the BCAC discussion focused on exit access corridors, it should be noted that this provision also impacts door openings in smoke barriers.

In theory, we support the BCAC proposal related to Section 3006.2.1 but only if the requirement to protect the openings in a corridor or smoke barrier is added to Chapter 7 or Chapter 10. The concerns are different and should be addressed in different sections of the IBC. Chapter 30 addresses the vertical migration of smoke in the hoistway. Chapters 7 and 10 address protecting a corridor and smoke barrier that is required to have a fire resistance rating. For most of the instances in which a fire resistance rated corridor is required, the building is not protected with an automatic sprinkler system. However, even in a building protected throughout with an automatic sprinkler system, the elevator hoistway is one area in which sprinkler protection is likely to be omitted. Does it make sense to require smoke- and draft-control assemblies on every other corridor door or smoke barrier door but then omit such a requirement from one of the few spaces that is not likely to be protected with sprinkler protection? If a door in a corridor or smoke barrier is provided to access a utility shaft, the door is required to meet smoke- and draft-control assembly requirements. However, if Section 3006.2.1 is not retained, or similar provisions are added to Chapter 7 as proposed herein, if an elevator is in the shaft the door is not required to meet smoke- and draft-control assembly requirements.

Project FAIL-SAFE, a project of the NASFM Fire Research & Education Foundation, included a phase of computer modeling that looked at the impact on fire behavior, occupant survivability, and structural resiliency in a Group R-2 occupancy, both with and without sprinkler protection. One of the conclusions of the modeling that was done by WPI was that the **"single largest impact on occupant egress survivability is compartmentation of smoke and multiple egress routes."**

In summary, the proposal does not change the requirements in the IBC, either the 2021 edition or prior editions. Instead it retains the current code requirements and clarifies that there are alternative means to ensure that the opening between an elevator hoistway and a fire resistance rated corridor or in a smoke barrier is protected in a manner equivalent to that required for all other openings into the corridor or smoke barrier.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies that there are alternative means to comply with current code provisions.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal clarifies the current text. For elevator hoistway door openings, section 3006.3 is applicable. (Vote: 13-0)

Final Hearing Results

FS84-21	AS

FS85-21

Original Proposal

IBC: 716.2.6.1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Marc Levitan, NIST, ICC 500 Storm Shelter Standard Committee (marc.levitan@nist.gov)

2021 International Building Code

Revise as follows:

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.
3. <u>Fire doors required solely for compliance with ICC 500 shall not be required to be self-closing or automatic-closing</u>.

Reason: The ICC 500 *Standard for the Design and Construction of Storm Shelters* allows a room or area within a larger building to be designed as a storm shelter, and requires the walls separating the storm shelter from the remaining portions of the host building to be constructed as 2-hour fire barriers, even if the IBC does not require a 2 hour rating.

The 2020 edition of ICC 500 provided an exception to the requirement for door closers in the situation where the fire-resistance rated wall is only required to separate a storm shelter from a host building. Any doors in the wall would still have to be fire-rated, but they would not have to include self or automatic closers. In a situation where large numbers of people need to enter the shelter quickly, such as for a tornado warning, exempting these doors from closers would allow for a constant flow of occupants seeking shelter without being interrupted by the door closing whenever someone releases the door.
Once people have entered the shelter, all openings can be secured from the inside by the personnel responsible for operating the shelter, or if necessary, by shelter occupants. Once the shelter doors are closed, the openings in the fire-resistance rated walls would be protected. When the storm is over, no closers would also allow for a smoother flow for egress.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC 500 Development Committee.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

The ICC 500 (Standard for the Design and Construction of Storm Shelters) development committee has held several virtual meetings during the last two years to develop the 202) edition. In addition, there were numerous virtual Working Group meetings. All meetings included members of the committee as well as interested parties. Related documents and reports are posted on the ICC 500 website at ICC 500.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Will not increase the cost of construction if anything it lowers the construction cost as the requirements for door closers are being reduced.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal is the appropriate application for the exception to the requirement for door closers in the situation where the fire-resistance-rated wall is only required to separate a storm shelter from a host building. The proposal utilizes protection per ICC 500 Standard for the Design and Construction of Storm Shelters. (Vote: 12-1)

Final Hearing Results

FS85-21	AS

FS88-21

Original Proposal

IBC: 717.2.4 (New) [IMC 607.2.4 (New)] , 717.2.4.1 (New) [IMC 607.4.1 (New)]

Proponents: William Koffel, Koffel Associates, Inc., Air Movement and Control Association (wkoffel@koffel.com)

2021 International Building Code

Add new text as follows:

717.2.4 Mechanical, electrical and plumbing controls. Mechanical, electrical and plumbing controls shall not be installed in air duct systems.

> **Exception:** Controls shall be permitted to be installed in air duct systems only if the wiring is directly associated with the air distribution system. The wiring shall be as short as practicable.

717.2.4.1 Controls not permitted to be installed through dampers. Mechanical, electrical and plumbing controls shall not be installed through fire dampers, smoke dampers, combination fire/smoke dampers or ceiling radiation dampers unless otherwise permitted by the manufacturer and the listing.

Reason:
There are instances in which wiring and/or cabling is run through fire dampers, smoke dampers, combination fire/smoke dampers, and ceiling radiation dampers, which can cause improper operation of the device during inspection and fire events. Adding the proposed language will prevent this occurrence, thereby increasing occupant safety and lowering building damage during a fire event.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not increase cost by adding materials or requirements. Alternative solutions would need to be used for instances where wiring is run through dampers, which might incur labor costs. However, this cost is justified since the full operation of these devices is paramount for increasing occupant safety and lowering building damage during a fire event.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 717.2.4 Mechanical, electrical and plumbing controls.
Mechanical, electrical and plumbing controls shall not be installed in air duct systems.

Exception: Controls shall be permitted to be installed in air duct systems only if the wiring is directly associated with the air distribution system. The wiring shall comply with the requirements of Section 602 of the International Mechanical Code andbe as short as practicable.

Committee Reason: The committee concluded the modification had improved the original proposal; it brings IMC 602 for wiring with a duct. The proposal is a good addition to the code text. (Vote: 13-0).

Final Hearing Results

FS88-21	AM

FS91-21

Original Proposal

IBC: 717.6 (IMC 607.6), 717.6.1 (IMC 607.6.1), 717.6.2 (New) [IMC 607.6.2 (New)]

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org); James Peterkin, TLC Engineering Solutions, TLC Engineering Solutions (jim.peterkin@tlc-eng.com)

2021 International Building Code

717.6 Horizontal assemblies. Penetrations by ducts and air transfer openings of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected by a shaft enclosure that complies with Section 713 or shall comply with Sections 717.6.1 through 717.6.3.

717.6.1 Through penetrations. In occupancies other than Groups I-2 and I-3, a duct constructed of approved materials in accordance with the *International Mechanical Code* that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two *stories* is permitted without *shaft enclosure* protection, provided that a *listed fire damper* is installed at the floor line or the duct is protected in accordance with Section 714.5. For air transfer openings, see Section 712.1.9.

Exception: A duct is permitted to penetrate three floors or less without a *fire damper* at each floor, provided that such duct meets all of the following requirements:

1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum wall thickness of 0.0187 inches (0.4712 mm) (No. 26 gage).
2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the building.
3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) in any 100 square feet (9.3 m^2) of floor area.
4. The *annular space* around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated.
5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 717.6.2.1.

Add new text as follows:

717.6.2 Through penetration for Group I-2 and I-3. In Group I-2 and I-3 occupancies a duct constructed of approved materials in accordance with the International Mechanical Code that penetrates a fire-resistance-rated floor of floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection, provided that a listed fire damper is installed at the floor line.

Reason: It does not make any sense to provide a shaft with a damper into the shaft and a damper out of the shaft when it only penetrates one floor. This is consistent with the federal certification requirements for the Centers for Medicaid and Medicare Services (e.g. NFPA 101 and NFPA 99).
This proposal is submitted by the ICC Committee on Healthcare (CHC) for Group I-2 in cooperation with Jim Peterkin for Group I-3.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will slightly decrease the cost of construction, because it eliminates a second damper and minimal shaft construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 717.6.1Through penetrations.

~~In occupancies other than Groups I-2 and I-3, a~~A duct constructed of approved materials in accordance with the *International Mechanical Code* that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two *stories* is permitted without *shaft enclosure* protection, provided that a *listed fire damper* is installed at the floor line or the duct is protected in accordance with Section 714.5. For air transfer openings, see Section 712.1.9.

Exception: In occupancies other than Group I-2 and I-3, a~~A~~ duct is permitted to penetrate three floors or less without a *fire damper* at each floor, provided that such duct meets all of the following requirements:

1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum wall thickness of 0.0187 inches (0.4712 mm) (No. 26 gage).
2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the building.
3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) in any 100 square feet (9.3 m^2) of floor area.
4. The *annular space* around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated.
5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 717.6.2.1.

~~717.6.2Through penetration for Group I-2 and I-3~~.
~~In Group I-2 and I-3 occupancies a duct constructed of approved materials in accordance with the International Mechanical Code that penetrates a fire-resistance-rated floor of floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection, provided that a listed fire damper is installed at the floor line.~~

Committee Reason: The committee concluded the modification clarifies the language by moving "In occupancies other than Group I-2 and I-3" into the exception. The proposal aligns IBC with the federal certification requirements for the Centers for Medicaid and Medicare Services. (Vote: 13-0)

Final Hearing Results

FS91-21	AM

FS96-21

Original Proposal

IBC: 718.2.1

Proponents: Christopher Athari, Hoover Treated Wood Products, Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

718.2.1 Fireblocking materials. *Fireblocking* shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) *wood structural panels* with joints backed by 0.719-inch (18.3 mm) *wood structural panels.*
4. One thickness of 0.75-inch (19.1 mm) *particleboard* with joints backed by 0.75-inch (19 mm) *particleboard.*
5. One-half-inch (12.7 mm) *gypsum board.*
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of *mineral wool*, *mineral fiber* or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.
9. *Mass timber* complying with Section 2304.11.
10. <u>One thickness of 19/32-inch (15.1 mm) fire-retardant-treated wood structural panel complying with Section 2303.2</u>.

Reason: Referencing the data in IBC table 722.6.2(1), one-half-inch gypsum board and 19/32-inch wood structural panel membranes have the same fire resistance. It is common practice to substitute FRTW structural panels for untreated wood structural panels. One thickness of 19/32-inch FRTW structural panel has the same fire resistance as one thickness of 19/32-inch untreated wood structural panel. One-half-inch gypsum board has a flame spread rating of 25 or less, and FRTW complying with IBC Section 2303.2 has a flame spread rating of 25 or less. Therefore, one thickness of 19/32-inch FRTW structural panel demonstrates both the equivalent fire resistance and flame spread properties of one-half-inch gypsum board.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The other 9 options remain unchanged and may be chosen as they were. This adds one more option.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approval is based on the proponent's reason statement. (Vote: 12-0)

Final Hearing Results

FS96-21 AS

FS97-21 Part I

Original Proposal

IBC: TABLE 721.1(2), FIGURE 722.5.1(2)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY CODE COMMITEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PROPERTY MAINTENANCE/ZONING CODE COMMITTEE. COMMITEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

TABLE 721.1(2) RATED FIRE-RESISTANCE PERIODS FOR VARIOUS WALLS AND PARTITIONS[a, o, p]

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE[b] (inches)			
			4 hours	3 hours	2 hours	1 hour
1. Brick of clay or shale	1-1.1	Solid brick of clay or shale.[c]	6	4.9	3.8	2.7
	1-1.2	Hollow brick, not filled.	5.0	4.3	3.4	2.3
	1-1.3	Hollow brick unit wall, grout or filled with perlite vermiculite or expanded shale aggregate.	6.6	5.5	4.4	3.0
	1-2.1	4" nominal thick units not less than 75 percent solid backed with a hat-shaped metal furring channel 3/4" thick formed from 0.021" sheet metal attached to the brick wall on 24" centers with approved fasteners, and 1/2" Type X gypsum wallboard attached to the metal furring strips with 1"-long Type S screws spaced 8" on center.	—	—	5[d]	—
2. Combination of clay brick and load-bearing hollow clay tile	2-1.1	4" solid brick and 4" tile (not less than 40 percent solid).	—	8	—	—
	2-1.2	4" solid brick and 8" tile (not less than 40 percent solid).	12	—	—	—
3. Concrete masonry units	3-1.1[f, g]	Expanded slag or pumice.	4.7	4.0	3.2	2.1
	3-1.2[f, g]	Expanded clay, shale or slate.	5.1	4.4	3.6	2.6
	3-1.3[f]	Limestone, cinders or air-cooled slag.	5.9	5.0	4.0	2.7
	3-1.4[f, g]	Calcareous or siliceous gravel.	6.2	5.3	4.2	2.8
4. Solid concrete[h, i]	4-1.1	Siliceous aggregate concrete.	7.0	6.2	5.0	3.5
		Carbonate aggregate concrete.	6.6	5.7	4.6	3.2
		Sand-lightweight concrete.	5.4	4.6	3.8	2.7
		Lightweight concrete.	5.1	4.4	3.6	2.5
5. Glazed or unglazed facing tile, nonload-bearing	5-1.1	One 2" unit cored 15 percent maximum and one 4" unit cored 25 percent maximum with 3/4" mortar-filled collar joint. Unit positions reversed in alternate courses.	—	6 3/8	—	—
	5-1.2	One 2" unit cored 15 percent maximum and one 4" unit cored 40 percent maximum with 3/4" mortar-filled collar joint. Unit positions side with 3/4" gypsum plaster. Two wythes tied together every fourth course with No. 22 gage corrugated metal ties.	—	6 3/4	—	—
	5-1.3	One unit with three cells in wall thickness, cored 29 percent maximum.	—	—	6	—
	5-1.4	One 2" unit cored 22 percent maximum and one 4" unit cored 41 percent maximum with 1/4" mortar-filled collar joint. Two wythes tied together every third course with 0.030"(No. 22 galvanized sheet steel gage) corrugated metal ties.	—	—	6	—
	5-1.5	One 4" unit cored 25 percent maximum with 3/4" gypsum plaster on one side.	—	—	4 3/4	—
	5-1.6	One 4" unit with two cells in wall thickness, cored 22 percent maximum.	—	—	—	4
	5-1.7	One 4" unit cored 30 percent maximum with 3/4" vermiculite gypsum plaster on one side.	—	—	4 1/2	—
	5-1.8	One 4" unit cored 39 percent maximum with 3/4" gypsum plaster on one side.	—	—	—	4 1/2
6. Solid gypsum plaster	6-1.1	3/4" by 0.055" (No. 16 carbon sheet steel gage) vertical cold-rolled channels, 16" on center with 2.6-pound flat metal lath applied to one face and tied with 0.049" (No. 18 B.W. gage) wire at 6" spacing. Gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	2[d]
	6-1.2	3/4" by 0.05" (No. 16 carbon sheet steel gage) cold-rolled channels 16" on center with metal lath applied to one face and tied with 0.049" (No. 18 B.W. gage) wire at 6" spacing. Perlite or vermiculite gypsum plaster each side. For three-coat work, the plaster mix for the second coat shall not exceed 100 pounds of gypsum to 2 1/2 cubic feet of aggregate for the 1-hour system.	—	—	2 1/2[d]	2[d]
	6-1.3	3/4" by 0.055" (No. 16 carbon sheet steel gage) vertical cold-rolled channels, 16" on center with 3/8" gypsum lath applied to one face and attached with sheet metal clips. Gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	2[d]
	6-2.1	Studless with 1/2" full-length plain gypsum lath and gypsum plaster each side. Plaster mixed 1:1 for scratch coat and 1:2 for brown coat, by weight, gypsum to sand aggregate.	—	—	—	2[d]
	6-2.2	Studless with 1/2" full-length plain gypsum lath and perlite or vermiculite gypsum plaster each side.	—	—	2 1/2[d]	2[d]
	6-2.3	Studless partition with 3/8" rib metal lath installed vertically adjacent edges tied 6" on center with No. 18 gage wire ties, gypsum plaster each side mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	2[d]

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE (inches) 4 hours	3 hours	2 hours	1 hour
7. Solid perlite and Portland cement	7-1.1	Perlite mixed in the ratio of 3 cubic feet to 100 pounds of Portland cement and machine applied to stud side of 1/2" mesh by 0.058-inch (No. 17 B.W. gage) paper-backed woven wire fabric lath wire-tied to 4"-deep steel trussed wire[j] studs 16" on center. Wire ties of 0.049" (No. 18 B.W. gage) galvanized steel wire 6" on center vertically.	—	—	3 1/8[d]	—
8. Solid neat wood fibered gypsum plaster	8-1.1	3/4" by 0.055-inch (No. 16 carbon sheet steel gage) cold-rolled channels, 12" on center with 2.5-pound flat metal lath applied to one face and tied with 0.049" (No. 18 B.W.gage) wire at 6" spacing. Neat gypsum plaster applied each side.	—	—	2[d]	—
9. Solid wallboard partition	9-1.1	One full-length layer 1/2" Type X gypsum wallboard[e] laminated to each side of 1" full-length V-edge gypsum coreboard with approved laminating compound. Vertical joints of face layer and coreboard staggered not less than 3".	—	—	2[d]	—
10. Hollow (studless) gypsum wallboard partition	10-1.1	One full-length layer of 5/8" Type X gypsum wallboard[e] attached to both sides of wood or metal top and bottom runners laminated to each side of 1" × 6" full-length gypsum coreboard ribs spaced 2" on center with approved laminating compound. Ribs centered at vertical joints of face plies and joints staggered 24" in opposing faces. Ribs ~~may~~ shall be permitted to be recessed 6" from the top and bottom.	—	—	—	2 1/4[d]
	10-1.2	1" regular gypsum V-edge full-length backing board attached to both sides of wood or metal top and bottom runners with nails or 1 5/8" drywall screws at 24" on center. Minimum width of runners 1 5/8". Face layer of 1/2" regular full-length gypsum wallboard laminated to outer faces of backing board with approved laminating compound.	—	—	4 5/8[d]	—
11. Noncombustible studs–interior partition with plaster each side	11-1.1	3 1/4" × 0.044" (No. 18 carbon sheet steel gage) steel studs spaced 24" on center. 5/8" gypsum plaster on metal lath each side mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	4 3/4[d]
	11-1.2	3 3/8" × 0.055" (No. 16 carbon sheet steel gage) approved nailable[k] studs spaced 24" on center. 5/8" neat gypsum wood-fibered plaster each side over 3/8" rib metal lath nailed to studs with 6d common nails, 8" on center. Nails driven 1 1/4" and bent over.	—	—	5 5/8	—
	11-1.3	4" × 0.044" (No. 18 carbon sheet steel gage) channel-shaped steel studs at 16" on center. On each side approved resilient clips pressed onto stud flange at 16" vertical spacing, 1/4" pencil rods snapped into or wire tied onto outer loop of clips, metal lath wire-tied to pencil rods at 6" intervals, 1" perlite gypsum plaster, each side.	—	7 5/8[d]	—	—
	11-1.4	2 1/2" × 0.044" (No. 18 carbon sheet steel gage) steel studs spaced 16" on center. Wood fibered gypsum plaster mixed 1:1 by weight gypsum to sand aggregate applied on 3/4-pound metal lath wire tied to studs, each side. 3/4" plaster applied over each face, including finish coat.	—	—	4 1/4[d]	—
12. Wood studs —interior partition with plaster each side	12-1.1[l, m]	2" × 4" wood studs 16" on center with 5/8" gypsum plaster on metal lath. Lath attached by 4d common nails bent over or No. 14 gage by 1 1/4" by 3/4" crown width staples spaced 6" on center. Plaster mixed 1:1 1/2 for scratch coat and 1:3 for brown coat, by weight, gypsum to sand aggregate.	—	—	—	5 1/8
	12-1.2[l]	2" × 4" wood studs 16" on center with metal lath and 7/8" neat wood-fibered gypsum plaster each side. Lath attached by 6d common nails, 7" on center. Nails driven 1 1/4" and bent over.	—	—	5 1/2[d]	—
	12-1.3[l]	2" × 4" wood studs 16" on center with 3/8" perforated or plain gypsum lath and 1/2" gypsum plaster each side. Lath nailed with 1 1/8" by No. 13 gage by 19/64" head plasterboard blued nails, 4" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	5 1/4
	12-1.4[l]	2" × 4" wood studs 16" on center with 3/8" Type X gypsum lath and 1/2" gypsum plaster each side. Lath nailed with 1 1/8" by No. 13 gage by 19/64" head plasterboard blued nails, 5" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.	—	—	—	5 1/4
13. Noncombustible studs–interior partition with gypsum wallboard each side	13-1.1	0.018" (No. 25 carbon sheet steel gage) channel-shaped studs 24" on center with one full-length layer of 5/8" Type X gypsum wallboard[e] applied vertically attached with 1"-long No. 6 dry wall screws to each stud. Screws are 8" on center around the perimeter and 12" on center on the intermediate stud. Where applied horizontally, the Type X gypsum wallboard shall be attached to 3 5/8" studs and the horizontal joints shall be staggered with those on the opposite side. Screws for the horizontal application shall be 8" on center at vertical edges and 12" on center at intermediate studs.	—	—	—	2 7/8[d]
	13-1.2	0.018" (No. 25 carbon sheet steel gage) channel-shaped studs 25" on center with two full-length layers of 1/2" Type X gypsum wallboard[e] applied vertically each side. First layer attached with 1"-long, No. 6 drywall screws, 8" on center around the perimeter and 12" on center on the intermediate stud. Second layer applied with vertical joints offset one stud space from first layer using 1 5/8" long, No. 6 drywall screws spaced 9" on center along vertical joints, 12" on center at intermediate studs and 24" on center along top and bottom runners.	—	—	3 5/8[d]	—
	13-1.3	0.055" (No. 16 carbon sheet steel gage) approved nailable metal studs[e] 24" on center with full-length 5/8" Type X gypsum wallboard[e] applied vertically and nailed 7" on center with 6d cement-coated common nails. Approved metal fastener grips used with nails at vertical butt joints along studs.	—	—	—	4 7/8
14. Wood studs —interior partition with gypsum wallboard each side	14-1.1[l, m]	2" × 4" wood studs 16" on center with two layers of 3/8" regular gypsum wallboard[e] each side, 4d cooler[n] or wallboard[n] nails at 8" on center first layer, 5d cooler[n] or wallboard[n] nails at 8" on center second layer with laminating compound between layers, joints staggered. First layer applied full length vertically, second layer applied horizontally or vertically.	—	—	—	5
	14-1.2[l, m]	2" × 4" wood studs 16" on center with two layers 1/2" regular gypsum wallboard[e] applied vertically or horizontally each side[k], joints staggered. Nail base layer with 5d cooler[n] or wallboard[n] nails at 8" on center face layer with 8d coole[n]r or wallboard[n] nails at 8" on center.	—	—	—	5 1/2
	14-1.3[l, m]	2" × 4" wood studs 24" on center with 5/8" Type X gypsum wallboard[e] applied vertically or horizontally nailed with 6d cooler[n] or wallboard[n] nails at 7" on center with end joints on nailing members. Stagger joints each side.	—	—	—	4 3/4
	14-1.4[l]	2" × 4" fire-retardant-treated wood studs spaced 24" on center with one layer of 5/8" Type X gypsum wallboard[e] applied with face paper grain (long dimension) parallel to studs. Wallboard attached with 6d cooler[n] or wallboard[n] nails at 7" on center.	—	—	—	4 3/4[d]
	14-1.5[l, m]	2" × 4" wood studs 16" on center with two layers 5/8" Type X gypsum wallboard[e] each side. Base layers applied vertically and nailed with 6d coole[n]r or wallboard[n] nails at 9" on center. Face layer applied vertically or horizontally and nailed with 8d coole[n]r or wallboard[n] nails at 7" on center. For nail-adhesive application, base layers are nailed 6" on center. Face layers applied with coating of approved wallboard adhesive and nailed 12" on center.	—	—	6	—
	14-1.6[l]	2" × 3" fire-retardant-treated wood studs spaced 24" on center with one layer of 5/8" Type X gypsum wallboard[e] applied with face paper grain (long dimension) at right angles to studs. Wallboard attached with 6d cement-coated box nails spaced 7" on center.	—	—	—	3 5/8[d]
15. Exterior or interior walls	15-1.1[l, m]	Exterior surface with 3/4" drop siding over 1/2" gypsum sheathing on 2" × 4" wood studs at 16" on center, interior surface treatment as required for 1-hour-rated exterior or interior 2" × 4" wood stud partitions. Gypsum sheathing nailed with 1 3/4" by No.11 gage by 7/16" head galvanized nails at 8" on center. Siding nailed with 7d galvanized smooth box nails.	—	—	—	Varies
	15-1.2[l, m]	2" × 4" wood studs 16" on center with metal lath and 3/4" cement plaster on each side. Lath attached with 6d common nails 7" on center driven to 1" minimum penetration and bent over. Plaster mix 1:4 for scratch coat and 1:5 for brown coat, by volume, cement to sand.	—	—	—	5 3/8
	15-1.3[l, m]	2" × 4" wood studs 16" on center with 7/8" cement plaster (measured from the face of studs) on the exterior surface with interior surface treatment as required for interior wood stud partitions in this table. Plaster mix 1:4 for scratch coat and 1:5 for brown coat, by volume, cement to sand.	—	—	—	Varies
	15-1.4	3 5/8" No. 16 gage noncombustible studs 16" on center with 7/8" cement plaster (measured from the face of the studs) on the exterior surface with interior surface treatment as required for interior, nonbearing, noncombustible stud partitions in this table. Plaster mix 1:4 for scratch coat and 1:5 for brown coat, by volume, cement to sand.	—	—	—	Varies[d]

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE (inches)			
			4 hours	3 hours	2 hours	1 hour
	15-1.5[m]	$2^{1}/_{4}$" × $3^{3}/_{4}$" clay face brick with cored holes over $^{1}/_{2}$" gypsum sheathing on exterior surface of 2" × 4" wood studs at 16" on center and two layers $^{5}/_{8}$" Type X gypsum wallboard[e] on interior surface. Sheathing placed horizontally or vertically with vertical joints over studs nailed 6" on center with $3^{1}/_{4}$" × No. 11 gage by $^{7}/_{16}$" head galvanized nails. Inner layer of wallboard placed horizontally or vertically and nailed 8" on center with 6d coole[n]r or wallboard[n] nails. Outer layer of wallboard placed horizontally or vertically and nailed 8" on center with 8d cooler[n] or wallboard[n] nails. Joints staggered with vertical joints over studs. Outer layer joints taped and finished with compound. Nail heads covered with joint compound. 0.035 inch (No. 20 galvanized sheet gage) corrugated galvanized steel wall ties $^{3}/_{4}$" by $6^{5}/_{8}$" attached to each stud with two 8d cooler[n] or wallboard[n] nails every sixth course of bricks.	—	—	10	—
	15-1.6[l, m]	2" × 6" fire-retardant-treated wood studs 16" on center. Interior face has two layers of $^{5}/_{8}$" Type X gypsum with the base layer placed vertically and attached with 6d box nails 12"on center. The face layer is placed horizontally and attached with 8d box nails 8" on center at joints and 12" on center elsewhere. The exterior face has a base layer of $^{5}/_{8}$" Type X gypsum sheathing placed vertically with 6d box nails 8" on center at joints and 12" on center elsewhere. An approved building paper is next applied, followed by self-furred exterior lath attached with $2^{1}/_{2}$", No. 12 gage galvanized roofing nails with a $^{3}/_{8}$" diameter head and spaced 6" on center along each stud. Cement plaster consisting of a $^{1}/_{2}$" brown coat is then applied. The scratch coat is mixed in the proportion of 1:3 by weight, cement to sand with 10 pounds of hydrated lime and 3 pounds of approved additives or admixtures per sack of cement. The brown coat is mixed in the proportion of 1:4 by weight, cement to sand with the same amounts of hydrated lime and approved additives or admixtures used in the scratch coat.	—	—	$8^{1}/_{4}$	—
	15-1.7[l, m]	2" × 6" wood studs 16" on center. The exterior face has a layer of $^{5}/_{8}$" Type X gypsum sheathing placed vertically with 6d box nails 8" on center at joints and 12" on center elsewhere. An approved building paper is next applied, followed by 1" by No. 18 gage self-furred exterior lath attached with 8d by $2^{1}/_{2}$"-long galvanized roofing nails spaced 6" on center along each stud. Cement plaster consisting of a $^{1}/_{2}$" scratch coat, a bonding agent and a $^{1}/_{2}$" brown coat and a finish coat is then applied. The scratch coat is mixed in the proportion of 1:3 by weight, cement to sand with 10 pounds of hydrated lime and 3 pounds of approved additives or admixtures per sack of cement. The brown coat is mixed in the proportion of 1:4 by weight, cement to sand with the same amounts of hydrated lime and approved additives or admixtures used in the scratch coat. The interior is covered with $^{3}/_{8}$" gypsum lath with 1" hexagonal mesh of 0.035 inch (No. 20 B.W. gage) woven wire lath furred out $^{5}/_{16}$" and 1" perlite or vermiculite gypsum plaster. Lath nailed with $1^{1}/_{8}$" by No. 13 gage by $^{19}/_{64}$" head plasterboard glued nails spaced 5" on center. Mesh attached by $1^{3}/_{4}$" by No. 12 gage by $^{3}/_{8}$" head nails with $^{3}/_{8}$" furrings, spaced 8" on center. The plaster mix shall not exceed 100 pounds of gypsum to $2^{1}/_{2}$ cubic feet of aggregate.	—	—	$8^{3}/_{8}$	—
	15-1.8[l, m]	2" × 6" wood studs 16" on center. The exterior face has a layer of $^{5}/_{8}$" Type X gypsum sheathing placed vertically with 6d box nails 8" on center at joints and 12" on center elsewhere. An approved building paper is next applied, followed by $1^{1}/_{2}$" by No. 17 gage self-furred exterior lath attached with 8d by $2^{1}/_{2}$"-long galvanized roofing nails spaced 6" on center along each stud. Cement plaster consisting of a $^{1}/_{2}$" scratch coat and a $^{1}/_{2}$" brown coat is then applied. The plaster ~~may~~ shall be permitted to be placed by machine. The scratch coat is mixed in the proportion of 1:4 by weight, plastic cement to sand. The brown coat is mixed in the proportion of 1:5 by weight, plastic cement to sand. The interior is covered with $^{3}/_{8}$" gypsum lath with 1" hexagonal mesh of No. 20-gage woven wire lath furred out $^{5}/_{16}$" and 1" perlite or vermiculite gypsum plaster. Lath nailed with $1^{1}/_{8}$" by No. 13 gage by $^{19}/_{64}$" head plasterboard glued nails spaced 5" on center. Mesh attached by $1^{3}/_{4}$" by No.12 gage by $^{3}/_{8}$" head nails with $^{3}/_{8}$" furrings, spaced 8" on center. The plaster mix shallnot exceed 100 pounds of gypsum to $2^{1}/_{2}$ cubic feet of aggregate.	—	—	$8^{3}/_{8}$	—
	15-1.9	4" No. 18 gage, nonload-bearing metal studs, 16" on center, with 1" Portland cement lime plaster (measured from the back side of the $^{3}/_{4}$-pound expanded metal lath) on the exterior surface. Interior surface to be covered with 1" of gypsum plaster on $^{3}/_{4}$-pound expanded metal lath proportioned by weight—1:2 for scratch coat, 1:3 for brown, gypsum to sand. Lath on one side of the partition fastened to $^{1}/_{4}$" diameter pencil rods supported by No. 20 gage metal clips, located 16" on center vertically, on each stud. 3" thick mineral fiber insulating batts friction fitted between the studs.	—	—	$6^{1}/_{2}$[d]	—
	15-1.10	Steel studs 0.060" thick, 4" deep or 6" at 16" or 24" centers, with $^{1}/_{2}$" glass fiber-reinforced concrete (GFRC) on the exterior surface. GFRC is attached with flex anchors at 24" on center, with 5" leg welded to studs with two $^{1}/_{2}$"-long flare-bevel welds, and 4" foot attached to the GFRC skin with $^{5}/_{8}$"-thick GFRC bonding pads that extend $2^{1}/_{2}$" beyond the flex anchor foot on both sides. Interior surface to have two layers of $^{1}/_{2}$" Type X gypsum wallboard.[e] The first layer of wallboard to be attached with 1"-long Type S buglehead screws spaced 24" on center and the second layer is attached with $1^{5}/_{8}$"-long Type S screws spaced at 12" on center. Cavity is to be filled with 5" of 4 pcf (nominal) mineral fiber batts. GFRC has $1^{1}/_{2}$" returns packed with mineral fiber and caulked on the exterior.	—	—	$6^{1}/_{2}$	—
	15-1.11	Steel studs 0.060" thick, 4" deep or 6" at 16" or 24" centers, respectively, with $^{1}/_{2}$" glass fiber-reinforced concrete (GFRC) on the exterior surface. GFRC is attached with flex anchors at 24" on center, with 5" leg welded to studs with two $^{1}/_{2}$"-long flare-bevel welds, and 4" foot attached to the GFRC skin with $^{5}/_{8}$"-thick GFRC bonding pads that extend $2^{1}/_{2}$" beyond the flex anchor foot on both sides. Interior surface to have one layerof $^{5}/_{8}$" Type X gypsum wallboard[e], attached with $1^{1}/_{4}$"-long Type S buglehead screws spaced 12" on center. Cavity is to be filled with 5" of 4 pcf (nominal) mineral fiber batts. GFRC has $^{1}1/2$" returns packed with mineral fiber and caulked on the exterior.	—	—	—	$6^{1}/_{8}$
	15-1.12[q]	2" × 6" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^{5}/_{8}$" Type X gypsum wallboard, 4′ wide, applied horizontally or vertically with vertical joints over studs, and fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 12" on center. Cavity to be filled with $5^{1}/_{2}$" mineral wool insulation.	—	—	—	$6^{3}/_{4}$
	15-1.13[q]	2" × 6" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^{5}/_{8}$" Type X gypsum wallboard, 4′ wide, applied vertically with all joints over framing or blocking and fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 12" on center. R-19 mineral fiber insulation installed in stud cavity.	—	—	—	$6^{3}/_{4}$
	15-1.14[q]	2" × 6" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^{5}/_{8}$" Type X gypsum wallboard, 4′ wide, applied horizontally or vertically with vertical joints over studs, and fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 7" on center.	—	—	—	$6^{3}/_{4}$
	15-1.15[q]	2" × 4" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^{5}/_{8}$" Type X gypsum wallboard and sheathing, respectively, 4′ wide, applied horizontally or vertically with vertical joints over studs, and fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 12" on center. Cavity to be filled with $3^{1}/_{2}$" mineral wool insulation.	—	—	—	$4^{3}/_{4}$
	15-1.16[q]	2" × 6" wood studs at 24" centers with double top plates, single bottom plate; interior and exterior side covered with two layers o ^{5}f/8" Type X gypsum wallboard, 4′ wide, applied horizontally with vertical joints over studs. Base layer fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 24" on center and face layer fastened with Type S drywall screws, spaced 8" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound. Cavity to be filled with $5^{1}/_{2}$" mineral wool insulation.	—	—	8	—
	15-2.1[d]	$3^{5}/_{8}$" No. 16 gage steel studs at 24" on center or 2" × 4" wood studs at 24" on center. Metal lath attached to the exterior side of studs with minimum 1" long No. 6 drywall screws at 6" on center and covered with minimum $^{3}/_{4}$" thick Portland cement plaster. Thin veneer brick units of clay or shale complying with C1157/C1157M–2017, Grade TBS or better, installed in running bond in accordance with Section 1404.10. Combined total thickness of the Portland cement plaster, mortar and thin veneer brick units shall be not less than $1^{3}/_{4}$". Interior side covered with one layer of $^{5}/_{8}$"-thick Type X gypsum wallboard attached to studs with 1" long No. 6 drywall screws at 12" on center.	—	—	—	6

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE (inches) 4 hours	3 hours	2 hours	1 hour
	15-2.2[d]	$3^{5}/_{8}$" No. 16 gage steel studs at 24" on center or 2" × 4" wood studs at 24" on center. Metal lath attached to the exterior side of studs with minimum 1" long No. 6 drywall screws at 6" on center and covered with minimum $^{3}/_{4}$" thick Portland cement plaster. Thin veneer brick units of clay or shale complying with C1157/C1157M–2017, Grade TBS or better, installed in running bond in accordance with Section 1404.10. Combined total thickness of the Portland cement plaster, mortar and thin veneer brick units shall be not less than 2". Interior side covered with two layers of $^{5}/_{8}$"-thick Type X gypsum wallboard. Bottom layer attached to studs with 1"-long No. 6 drywall screws at 24" on center. Top layer attached to studs with $1^{5}/_{8}$"-long No. 6 drywall screws at 12" on center.	—	—	$6^{7}/_{8}$	—
	15-2.3[d]	$3^{5}/_{8}$" No. 16 gage steel studs at 16" on center or 2" × 4" wood studs at 16" on center. Where metal lath is used, attach to the exterior side of studs with minimum 1"-long No. 6 drywall screws at 6" on center. Brick units of clay or shale not less than $2^{5}/_{8}$" thick complying with C270–14a installed in accordance with Section 1404.6 with a minimum 1" airspace. Interior side covered with one layer of $^{5}/_{8}$"-thick Type X gypsum wallboard attached to studs with 1"-long No. 6 drywall screws at 12" on center.	—	—	—	$7^{7}/_{8}$
	15-2.4[d]	$3^{5}/_{8}$" No. 16 gage steel studs at 16" on center or 2" × 4" wood studs at 16" on center. Where metal lath is used, attach to the exterior side of studs with minimum 1"-long No. 6 drywall screws at 6" on center. Brick units of clay or shale not less than $2^{5}/_{8}$" thick complying with C270–14a installed in accordance with Section 1404.6 with a minimum 1" airspace. Interior side covered with two layers of $^{5}/_{8}$"-thick Type X gypsum wallboard. Bottom layer attached to studs with 1"-long No. 6 drywall screws at 24" on center. Top layer attached to studs with $1^{5}/_{8}$"-long No. 6 drywall screws at 12" on center.	—	—	$8^{1}/_{2}$	—
16. Exterior walls rated for fire resistance from the inside only in accordance with Section 705.5.	16-1.1[q]	2" × 4" wood studs at 16" centers with double top plates, single bottom plate; interior side covered with $^{5}/_{8}$" Type X gypsum wallboard, 4' wide, applied horizontally unblocked, and fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 12" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound. Exterior covered with $^{3}/_{8}$" wood structural panels, applied vertically, horizontal joints blocked and fastened with 6d common nails (bright)–12" on center in the field, and 6" on center panel edges. Cavity to be filled with $3^{1}/_{2}$" mineral wool insulation. Rating established for exposure from interior side only.	—	—	—	$4^{1}/_{2}$
	16-1.2[q]	2" × 6" wood studs at 16" centers with double top plates, single bottom plate; interior side covered with $^{5}/_{8}$" Type X gypsum wallboard, 4' wide, applied horizontally or vertically with vertical joints over studs and fastened with $2^{1}/_{4}$" Type S drywall screws, spaced 12" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound, exterior side covered with $^{7}/_{16}$" wood structural panels fastened with 6d common nails (bright) spaced 12" on center in the field and 6" on center along the panel edges. Cavity to be filled with $5^{1}/_{2}$" mineral wool insulation. Rating established from the gypsum-covered side only.	—	—	—	$6^{9}/_{16}$
	16-1.3[q]	2" × 6" wood studs at 16" centers with double top plates, single bottom plates; interior side covered with $^{5}/_{8}$" Type X gypsum wallboard, 4'wide, applied vertically with all joints over framing or blocking and fastened with $2^{1}/_{4}$" Type S drywall screws spaced 7" on center. Joints to be covered with tape and joint compound. Exterior covered with $^{3}/_{8}$" wood structural panels, applied vertically with edges over framing or blocking and fastened with 6d common nails (bright) at 12" on center in the field and 6" on center on panel edges. R-19 mineral fiber insulation installed in stud cavity. Rating established from the gypsum-covered side only.	—	—	—	$6^{1}/_{2}$

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Thickness shown for brick and clay tile is nominal thicknesses unless plastered, in which case thicknesses are net. Thickness shown for concrete masonry and clay masonry is equivalent thickness defined in Section 722.3.1 for concrete masonry and Section 722.4.1.1 for clay masonry. Where all cells are solid grouted or filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, the equivalent thickness shall be the thickness of the block or brick using specified dimensions as defined in Chapter 21. Equivalent thickness shall include the thickness of applied plaster and lath or gypsum wallboard, where specified.

c. For units in which the net cross-sectional area of cored brick in any plane parallel to the surface containing the cores is not less than 75 percent of the gross cross-sectional area measured in the same plane.

d. Shall be used for nonbearing purposes only.

e. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surface is covered with not less than $^{1}/_{16}$-inch gypsum veneer plaster.

f. The fire-resistance time period for concrete masonry units meeting the equivalent thicknesses required for a 2-hour fire-resistance rating in Item 3, and having a thickness of not less than $7^{5}/_{8}$ inches is 4 hours where cores that are not grouted are filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, sand or slag having a maximum particle size of $^{3}/_{8}$ inch.

g. The fire-resistance rating of concrete masonry units composed of a combination of aggregate types or where plaster is applied directly to the concrete masonry shall be determined in accordance with ACI 216.1/TMS 0216. Lightweight aggregates shall have a maximum combined density of 65 pounds per cubic foot.

h. See Note b. The equivalent thickness shall be permitted to include the thickness of cement plaster or 1.5 times the thickness of gypsum plaster applied in accordance with the requirements of Chapter 25.

i. Concrete walls shall be reinforced with horizontal and vertical temperature reinforcement as required by Chapter 19.

j. Studs are welded truss wire studs with 0.18 inch (No. 7 B.W. gage) flange wire and 0.18 inch (No. 7 B.W. gage) truss wires.

k. Nailable metal studs consist of two channel studs spot welded back to back with a crimped web forming a nailing groove.

l. Wood structural panels shall be permitted to be installed between the fire protection and the wood studs on either the interior or exterior side of the wood frame assemblies in this table, provided that the length of the fasteners used to attach the fire protection is increased by an amount not less than the thickness of the wood structural panel.

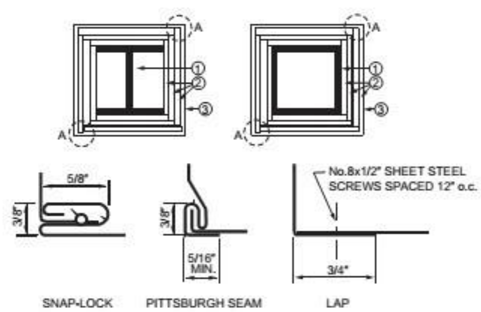
m. For studs with a slenderness ratio, l_e/d, greater than 33, the design stress shall be reduced to 78 percent of allowable F'_c. For studs with a slenderness ratio, l_e/d, not exceeding 33, the design stress shall be reduced to 78 percent of the adjusted stress F'_c calculated for studs having a slenderness ratio l_e/d of 33.

n. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

o. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA 600 shall be accepted as if herein specified.

p. NCMA TEK 5-8A shall be permitted for the design of fire walls.

q. The design stress of studs shall be equal to not more than 100 percent of the allowable F'_c calculated in accordance with Section 2306.



CORNER JOINT DETAILS (A)

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

1. Structural steel column, either wide flange or tubular shapes.

2. Type X gypsum board or gypsum panel products in accordance with ASTM C1177, C1178, C1278, C1396 or C1658. The total thickness of gypsum board or gypsum panel products calculated as *h* in Section 722.5.1.2 shall be applied vertically to an individual column using one of the following methods:
    1. As a single layer without horizontal joints.
    2. As multiple layers with horizontal joints not permitted in any layer.
    3. As multiple layers with horizontal joints staggered not less than 12 inches vertically between layers and not less than 8 feet vertically in any single layer. The total required thickness of gypsum board or gypsum panel products shall be determined on the basis of the specified fire-resistance rating and the weight-to-heated-perimeter ratio (W/D) of the column. For fire-resistance ratings of 2 hours or less, one of the required layers of gypsum board or gypsum panel product ~~may~~ shall be permitted to be applied to the exterior of the sheet steel column covers with 1-inch long Type S screws spaced 1 inch from the wallboard edge and 8 inches on center. For such installations, 0.0149-inch minimum thickness galvanized steel corner beads with $1^1/_2$-inch legs shall be attached to the wallboard with Type S screws spaced 12 inches on center.

3. For fire-resistance ratings of 3 hours or less, the column covers shall be fabricated from 0.0239-inch minimum thickness galvanized or stainless steel. For 4-hour fire-resistance ratings, the column covers shall be fabricated from 0.0239-inch minimum thickness stainless steel. The column covers shall be erected with the Snap Lock or Pittsburgh joint details. For fire-resistance ratings of 2 hours or less, column covers fabricated from 0.0269-inch minimum thickness galvanized or stainless steel shall be permitted to be erected with lap joints. The lap joints shall be permitted to be located anywhere around the perimeter of the column cover. The lap joints shall be secured with $^1/_2$-inch-long No. 8 sheet metal screws spaced 12 inches on center. The column covers shall be provided with a minimum expansion clearance of $^1/_8$ inch per linear foot between the ends of the cover and any restraining construction.

FIGURE 722.5.1(2) GYPSUM-PROTECTED STRUCTURAL STEEL COLUMNS WITH SHEET STEEL COLUMN COVERS

Reason: The term ‘may’ is subjective. The proposal is to bring the text into enforceable language by using the ICC preferred language.as often as possible. Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.
This is a joint proposal submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at:
FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are only changing verbiage.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal provides consistency for the text throughout the code and replaces the current text of "may" with enforceable language. (Vote: 13-0)

Final Hearing Results

FS97-21 Part I	AS

FS97-21 Part II

Original Proposal

IFC: 5704.2.9.7.5.1, TABLE 6109.12

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5704.2.9.7.5.1 Information signs. A permanent sign shall be provided at the fill point for the tank, documenting the filling procedure and the tank calibration chart.

> **Exception:** Where climatic conditions are such that the sign ~~may be~~ has the potential to be obscured by ice or snow, or weathered beyond readability or otherwise impaired, said procedures and chart shall be located in the office window, lock box or other area available to the person filling the tank.

TABLE 6109.12 SEPARATION FROM EXPOSURES OF LP-GAS CONTAINERS AWAITING USE, RESALE OR EXCHANGE STORED OUTSIDE OF BUILDINGS

QUANTITY OF LP-GAS STORED (pounds)	MINIMUM SEPARATION DISTANCE FROM STORED LP-GAS CYLINDERS TO (feet):						
	Nearest important building or group of buildings or line of adjoining property that ~~may be~~ has the potential to be built on	Line of adjoining property occupied by schools, places of religious worship, hospitals, athletic fields or other points of public gathering; busy thoroughfares; or sidewalks	LP-gas dispensing station	Doorway or opening to a building with two or more means of egress	Doorway or opening to a building with one means of egress	Combustible materials	Motor vehicle fuel dispenser
720 or less	0	0	5	5	10	10	20
721–2,500	0	10	10	5	10	10	20
2,501–6,000	10	10	10	10	10	10	20
6,001–10,000	20	20	20	20	20	10	20
Over 10,000	25	25	25	25	25	10	20

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

Reason: The term 'may' is subjective. The proposal is to bring the text into enforceable language by using the ICC preferred language.as often as possible. Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.
This is a joint proposal submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at:
FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are only changing verbiage.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved based upon the approval of Parts I and III and the fact that the proposal appropriately changes non-mandatory language to enforceable language. (Vote:14-0)

Final Hearing Results

FS97-21 Part II	AS

FS97-21 Part III

Original Proposal

IZC: 302.1, 305.1, 1004.4, 1008.1.1, 1008.2.4, 1008.2.6, 1009.2, 1301.1, 1302.2

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Zoning Code

Revise as follows:

302.1 Minimum areas. The minimum areas that ~~may~~ constitute a separate or detached part of any of the following zoning districts on the zoning map or subsequent amendments to said zoning map shall be as shown in Table 302.1. Where a nonresidential district is directly across the street from or abuts the district with the same or less restrictive classification, the area of the land directly across the street or abutting the property ~~may~~ shall be permitted to be included in the calculations in meeting the minimum district size requirements.

305.1 General. The principal objective of this zoning code is to provide for an orderly arrangement of compatible buildings and land uses, and for the property location of all types of uses required for the social and economic welfare of the community. To accomplish this objective, each type and kind of use is classified as permitted in one or more of the various use districts established by this code. However, in addition to those uses specifically classified and permitted in each district, there are certain additional uses that it ~~may be~~ is necessary to allow because of the unusual characteristics of the service they provide the public. These *conditional uses* require particular considerations as to their proper location to adjacent, established or intended uses, or to the planned growth of the community. The conditions controlling the locations and operation of such special uses are established by the applicable sections of this code.

1004.4 Traffic visibility. Signs or sign structures shall not be erected at the intersection of any street in such a manner as to obstruct free and clear vision, nor at any location where by its position, shape or color it ~~may interfere~~ interferes with or obstruct the view of or be confused with any authorized traffic sign, signal or device.

1008.1.1 Wall signs. Every single-family residence, multiple-family residential complex, commercial or *industrial* building, and every separate nonresidential building in a residential zone ~~may~~ shall be permitted to display wall signs per street frontage subject to the limiting standards set forth in Table 1008.1.1(1). For shopping centers, planned *industrial parks* or other multiple-occupancy nonresidential buildings, the building face or wall shall be calculated separately for each separate occupancy, but in no event will the allowed area for any separate occupancy be less than [JURISDICTION TO INSERT NUMBER] square feet.

1008.2.4 Special event signs in public ways. Signs advertising a special community event shall not be prohibited in or over public rights- of-way, subject to approval by the code official as to the size, location and method of erection. The code official ~~may~~shall be permitted to not approve any special event signage that would impair the safety and convenience of use of public rights-of-way, or obstruct traffic visibility.

1008.2.6 Political signs. Political signs shall be permitted in all zoning districts, subject to the following limitations:

1. Such signs shall not exceed a height of [JURISDICTION TO INSERT NUMBER] feet nor an area of [JURISDICTION TO INSERT NUMBER] square feet.
2. Such signs for election candidates or ballot propositions shall be displayed only for a period of 60 days preceding the election and shall be removed within 10 days after the election, provided that signs promoting successful candidates or ballot propositions in a primary election ~~may~~ shall be permitted to remain displayed until not more than 10 days after the general election.
3. Such signs shall not be placed in any public right-of-way or obstruct traffic visibility.

1009.2 Development complex sign. In addition to the freestanding business identification signs otherwise allowed by this ordinance, every multiple-occupancy development complex shall be entitled to one free-standing sign per street front, at the maximum size permitted for business identification free-standing signs, to identify the development complex. Business identification shall not be permitted on a development complex sign. Any free-standing sign otherwise permitted under this ordinance ~~may~~ shall identify the name of the development complex.

1301.1 Approval. *Planned unit developments* (PUDs) shall be allowed by planning commission approval in any zoning district. Such *planned unit development* permit shall not be granted unless such development will meet the use limitations of the zoning district in which it is located and meet the *density* and other limitations of such districts, except as such requirements ~~may~~ shall be lawfully modified as provided by this code. Compliance with the regulations of this code in no way excuses the developer from the applicable requirements of a subdivision ordinance, except as modifications thereof are specifically authorized in the approval of the application for the planned unit development.

1302.2 Uses. A *planned unit development* that will contain uses not permitted in the zoning district in which it is to be located will require a change of zoning district and shall be accompanied by an application for a zoning amendment, except that any residential use shall be considered to be a permitted use in a *planned unit development*, which allows residential uses and shall be governed by *density*, design and other requirements of the *planned unit development* permit.
Where a site is situated in more than one use district, the permitted uses applicable to such property in one district ~~may~~ shall be permitted to be extended into the adjacent use district.

Reason: The term 'may' is subjective. The proposal is to bring the text into enforceable language by using the ICC preferred language.as often as possible. Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.
This is a joint proposal submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at:
FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are only changing verbiage.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that substituting the subjective term "may" with more enforceable language was appropriate. (Vote 11-0)

Final Hearing Results

FS97-21 Part III AS

FS98-21

Original Proposal

IBC: TABLE 721.1(2)

Proponents: David Tyree, American Wood Council, AWC (dtyree@awc.org); Jason Smart, American Wood Council, AWC (jsmart@awc.org)

2021 International Building Code

Revise as follows:

TABLE 721.1(2) RATED FIRE-RESISTANCE PERIODS FOR VARIOUS WALLS AND PARTITIONS[a, o, p]

Portions of table not shown remain unchanged.

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE[b] (inches)			
			4 hours	3 hours	2 hours	1 hour
16. Exterior walls rated for fire resistance from the inside only in accordance with Section 705.5.	16-1.4[q]	2" × 6" wood studs at 24" centers with double top plates, single bottom plates; interior side covered with $^{5}/_{8}$" Type X gypsum wallboard, 4' wide, applied vertically with all joints over framing or blocking and fastened with 2$^{1}/_{4}$" Type S drywall screws spaced 7" on center. Joints covered with tape and joint compound. Exterior covered with $^{15}/_{32}$" wood structural panels, applied vertically with edges over framing or blocking and fastened with 6d common nails (bright) at 12" on center in the field and 6" on center on panel edges. R-19 fiberglass insulation installed in stud cavity. Rating established from the gypsum-covered side only.	=	=	=	6$^{19}/_{32}$

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Thickness shown for brick and clay tile is nominal thicknesses unless plastered, in which case thicknesses are net. Thickness shown for concrete masonry and clay masonry is equivalent thickness defined in Section 722.3.1 for concrete masonry and Section 722.4.1.1 for clay masonry. Where all cells are solid grouted or filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, the equivalent thickness shall be the thickness of the block or brick using specified dimensions as defined in Chapter 21. Equivalent thickness shall include the thickness of applied plaster and lath or gypsum wallboard, where specified.

c. For units in which the net cross-sectional area of cored brick in any plane parallel to the surface containing the cores is not less than 75 percent of the gross cross-sectional area measured in the same plane.

d. Shall be used for nonbearing purposes only.

e. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surface is covered with not less than $^{1}/_{16}$-inch gypsum veneer plaster.

f. The fire-resistance time period for concrete masonry units meeting the equivalent thicknesses required for a 2-hour fire-resistance rating in Item 3, and having a thickness of not less than 7$^{5}/_{8}$ inches is 4 hours where cores that are not grouted are filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, sand or slag having a maximum particle size of $^{3}/_{8}$ inch.

g. The fire-resistance rating of concrete masonry units composed of a combination of aggregate types or where plaster is applied directly to the concrete masonry shall be determined in accordance with ACI 216.1/TMS 0216. Lightweight aggregates shall have a maximum combined density of 65 pounds per cubic foot.

h. See Note b. The equivalent thickness shall be permitted to include the thickness of cement plaster or 1.5 times the thickness of gypsum plaster applied in accordance with the requirements of Chapter 25.

i. Concrete walls shall be reinforced with horizontal and vertical temperature reinforcement as required by Chapter 19.

j. Studs are welded truss wire studs with 0.18 inch (No. 7 B.W. gage) flange wire and 0.18 inch (No. 7 B.W. gage) truss wires.

k. Nailable metal studs consist of two channel studs spot welded back to back with a crimped web forming a nailing groove.

l. Wood structural panels shall be permitted to be installed between the fire protection and the wood studs on either the interior or exterior side of the wood frame assemblies in this table, provided that the length of the fasteners used to attach the fire protection is increased by an amount not less than the thickness of the wood structural panel.

m. For studs with a slenderness ratio, l_e/d, greater than 33, the design stress shall be reduced to 78 percent of allowable F'_c. For studs with a slenderness ratio, l_e/d, not exceeding 33, the design stress shall be reduced to 78 percent of the adjusted stress F'_c calculated for studs having a slenderness ratio l_e/d of 33.

n. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

o. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA 600 shall be accepted as if herein specified.

p. NCMA TEK 5-8A shall be permitted for the design of fire walls.

q. The design stress of studs shall be equal to not more than 100 percent of the allowable F'_c calculated in accordance with Section 2306.

Reason: Fire-resistance-rated wood-frame assemblies can be found in a number of sources including the *IBC*, Underwriters Laboratories (UL) *Fire Resistance Directory*, Intertek Testing Services' *Directory of Listed Products*, and the Gypsum Association's *Fire Resistance Design Manual*. The American Wood Council (AWC) has tested a number of wood-frame fire-resistance-rated assemblies. This proposal is adding another tested assembly which is popular among designers and is being provided for the convenience of the building official. It is the same as Assembly WS6-1.6 in the American Wood Council's publication titled *Design for Code Acceptance (DCA) 3 - Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies*, which may be downloaded from the AWC website. Similar descriptions of successfully tested wood stud wall assemblies are provided in Table 721.1(2) for one-hour and two-hour fire-resistance-rated wall assemblies.

Bibliography: Design for Code Acceptance (DCA) 3 – *Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies*, American Wood Council, 2020,
https://awc.org/pdf/codes-standards/publications/dca/AWC_DCA3_20200401_AWCWebsite.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply adds another tested assembly for one-hour wall construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal gives another option for the rated fire-resistance periods for various walls and partitions and addresses the code's energy requirements. (Vote: 12-0)

Final Hearing Results

FS98-21	AS

FS99-21

Original Proposal

IBC: TABLE 721.1(2)

Proponents: John-Jozef Proczka, City of Phoenix, self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

TABLE 721.1(2) RATED FIRE-RESISTANCE PERIODS FOR VARIOUS WALLS AND PARTITIONS[a, o, p]

Portions of table not shown remain unchanged.

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE[b] (inches)			
			4 hours	3 hours	2 hours	1 hour
15. Exterior or interior walls	15-1.1[l, m]	Exterior surface with 3/4" drop siding over 1/2" gypsum sheathing on 2" × 4" wood studs at 16" on center, interior surface treatment as required for 1-hour-rated exterior or interior 2" × 4" wood stud partitions. Gypsum sheathing nailed with 1 3/4" by No.11 gage by 7/16" head galvanized nails at 8" on center. Siding nailed with 7d galvanized smooth box nails.	—	—	—	Varies
	15-1.2[l, m]	2" × 4" wood studs 16" on center with metal lath and 3/4" cement plaster on each side. Lath attached with 6d common nails 7" on center driven to 1" minimum penetration and bent over. Plaster mix 1:4 for scratch coat and 1:5 for brown coat, by volume, cement to sand.	—	—	—	5 3/8
	15-1.3[l, m]	2" × 4" wood studs 16" on center with 7/8" cement plaster (measured from the face of studs) on the exterior surface with interior surface treatment as required for interior wood stud partitions in this table. Plaster mix 1:4 for scratch coat and 1:5 for brown coat, by volume, cement to sand.	—	—	—	Varies
	15-1.4	3 5/8" No. 16 gage noncombustible studs 16" on center with 7/8" cement plaster (measured from the face of the studs) on the exterior surface with interior surface treatment as required for interior, nonbearing, noncombustible stud partitions in this table. Plaster mix 1:4 for scratch coat and 1:5 for brown coat, by volume, cement to sand.	—	—	—	Varies[d]
	15-1.5[m]	2 1/4" × 3 3/4" clay face brick with cored holes over 1/2" gypsum sheathing on exterior surface of 2" × 4" wood studs at 16" on center and two layers 5/8" Type X gypsum wallboard[e] on interior surface. Sheathing placed horizontally or vertically with vertical joints over studs nailed 6" on center with 3 1/4" × No. 11 gage by 7/16" head galvanized nails. Inner layer of wallboard placed horizontally or vertically and nailed 8" on center with 6d coole[n]r or wallboard[n] nails. Outer layer of wallboard placed horizontally or vertically and nailed 8" on center with 8d cooler[n] or wallboard[n] nails. Joints staggered with vertical joints over studs. Outer layer joints taped and finished with compound. Nail heads covered with joint compound. 0.035 inch (No. 20 galvanized sheet gage) corrugated galvanized steel wall ties 3/4" by 6 5/8" attached to each stud with two 8d cooler[n] or wallboard[n] nails every sixth course of bricks.	—	—	10	—
	15-1.6[l, m]	2" × 6" fire-retardant-treated wood studs 16" on center. Interior face has two layers of 5/8" Type X gypsum with the base layer placed vertically and attached with 6d box nails 12"on center. The face layer is placed horizontally and attached with 8d box nails 8" on center at joints and 12" on center elsewhere. The exterior face has a base layer of 5/8" Type X gypsum sheathing placed vertically with 6d box nails 8" on center at joints and 12" on center elsewhere. An approved building paper is next applied, followed by self-furred exterior lath attached with 2 1/2", No. 12 gage galvanized roofing nails with a 3/8" diameter head and spaced 6" on center along each stud. Cement plaster consisting of a 1/2" brown coat is then applied. The scratch coat is mixed in the proportion of 1:3 by weight, cement to sand with 10 pounds of hydrated lime and 3 pounds of approved additives or admixtures per sack of cement. The brown coat is mixed in the proportion of 1:4 by weight, cement to sand with the same amounts of hydrated lime and approved additives or admixtures used in the scratch coat.	—	—	8 1/4	—
	15-1.7[l, m]	2" × 6" wood studs 16" on center. The exterior face has a layer of 5/8" Type X gypsum sheathing placed vertically with 6d box nails 8" on center at joints and 12" on center elsewhere. An approved building paper is next applied, followed by 1" by No. 18 gage self-furred exterior lath attached with 8d by 2 1/2"-long galvanized roofing nails spaced 6" on center along each stud. Cement plaster consisting of a 1/2" scratch coat, a bonding agent and a 1/2" brown coat and a finish coat is then applied. The scratch coat is mixed in the proportion of 1:3 by weight, cement to sand with 10 pounds of hydrated lime and 3 pounds of approved additives or admixtures per sack of cement. The brown coat is mixed in the proportion of 1:4 by weight, cement to sand with the same amounts of hydrated lime and approved additives or admixtures used in the scratch coat. The interior is covered with 3/8" gypsum lath with 1" hexagonal mesh of 0.035 inch (No. 20 B.W. gage) woven wire lath furred out 5/16" and 1" perlite or vermiculite gypsum plaster. Lath nailed with 1 1/8" by No. 13 gage by 19/64" head plasterboard glued nails spaced 5" on center. Mesh attached by 1 3/4" by No. 12 gage by 3/8" head nails with 3/8" furrings, spaced 8" on center. The plaster mix shall not exceed 100 pounds of gypsum to 2 1/2 cubic feet of aggregate.	—	—	8 3/8	—
	15-1.8[l, m]	2" × 6" wood studs 16" on center. The exterior face has a layer of 5/8" Type X gypsum sheathing placed vertically with 6d box nails 8" on center at joints and 12" on center elsewhere. An approved building paper is next applied, followed by 1 1/2" by No. 17 gage self-furred exterior lath attached with 8d by 2 1/2"-long galvanized roofing nails spaced 6" on center along each stud. Cement plaster consisting of a 1/2" scratch coat and a 1/2" brown coat is then applied. The plaster may be placed by machine. The scratch coat is mixed in the proportion of 1:4 by weight, plastic cement to sand. The brown coat is mixed in the proportion of 1:5 by weight, plastic cement to sand. The interior is covered with 3/8" gypsum lath with 1" hexagonal mesh of No. 20-gage woven wire lath furred out 5/16" and 1" perlite or vermiculite gypsum plaster. Lath nailed with 1 1/8" by No. 13 gage by 19/64" head plasterboard glued nails spaced 5" on center. Mesh attached by 1 3/4" by No.12 gage by 3/8" head nails with 3/8" furrings, spaced 8" on center. The plaster mix shallnot exceed 100 pounds of gypsum to 2 1/2 cubic feet of aggregate.	—	—	8 3/8	—
	15-1.9	4" No. 18 gage, nonload-bearing metal studs, 16" on center, with 1" Portland cement lime plaster (measured from the back side of the 3/4-pound expanded metal lath) on the exterior surface. Interior surface to be covered with 1" of gypsum plaster on 3/4-pound expanded metal lath proportioned by weight–1:2 for scratch coat, 1:3 for brown, gypsum to sand. Lath on one side of the partition fastened to 1/4" diameter pencil rods supported by No. 20 gage metal clips, located 16" on center vertically, on each stud. 3" thick mineral fiber insulating batts friction fitted between the studs.	—	—	6 1/2[d]	—
	15-1.10	Steel studs 0.060" thick, 4" deep or 6" at 16" or 24" centers, with 1/2" glass fiber-reinforced concrete (GFRC) on the exterior surface. GFRC is attached with flex anchors at 24" on center, with 5" leg welded to studs with two 1/2"-long flare-bevel welds, and 4" foot attached to the GFRC skin with 5/8"-thick GFRC bonding pads that extend 2 1/2" beyond the flex anchor foot on both sides. Interior surface to have two layers of 1/2" Type X gypsum wallboard.[e] The first layer of wallboard to be attached with 1"-long Type S buglehead screws spaced 24" on center and the second layer is attached with 1 5/8"-long Type S screws spaced at 12" on center. Cavity is to be filled with 5" of 4 pcf (nominal) mineral fiber batts. GFRC has 1 1/2" returns packed with mineral fiber and caulked on the exterior.	—	—	6 1/2	—

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE (inches)			
			4 hours	3 hours	2 hours	1 hour
	15-1.11	Steel studs 0.060" thick, 4" deep or 6" at 16" or 24" centers, respectively, with $^1/_2$" glass fiber-reinforced concrete (GFRC) on the exterior surface. GFRC is attached with flex anchors at 24" on center, with 5" leg welded to studs with two $^1/_2$"-long flare-bevel welds, and 4" foot attached to the GFRC skin with $^5/_8$"-thick GFRC bonding pads that extend $2^1/_2$" beyond the flex anchor foot on both sides. Interior surface to have one layerof $^5/_8$" Type X gypsum wallboard[e], attached with $1^1/_4$"-long Type S buglehead screws spaced 12" on center. Cavity is to be filled with 5" of 4 pcf (nominal) mineral fiber batts. GFRC has $1^1/_2$" returns packed with mineral fiber and caulked on the exterior.	—	—	—	$6^1/_8$
	15-1.12[q]	2" × 6" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^5/_8$" Type X gypsum wallboard, 4′ wide, applied horizontally or vertically with vertical joints over studs, and fastened with $2^1/_4$" Type S drywall screws, spaced 12" on center. Cavity to be filled with $5^1/_2$" mineral wool insulation.	—	—	—	$6^3/_4$
	15-1.13[q]	2" × 6" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^5/_8$" Type X gypsum wallboard, 4′ wide, applied vertically with all joints over framing or blocking and fastened with $2^1/_4$" Type S drywall screws, spaced 12" on center. R-19 mineral fiber insulation installed in stud cavity.	—	—	—	$6^3/_4$
	15-1.14[q]	2" × 6" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^5/_8$" Type X gypsum wallboard, 4′ wide, applied horizontally or vertically with vertical joints over studs, and fastened with $2^1/_4$" Type S drywall screws, spaced 7" on center.	—	—	—	$6^3/_4$
	15-1.15[q]	2" × 4" wood studs at 16" with double top plates, single bottom plate; interior and exterior sides covered with $^5/_8$" Type X gypsum wallboard and sheathing, respectively, 4′ wide, applied horizontally or vertically with vertical joints over studs, and fastened with $2^1/_4$" Type S drywall screws, spaced 12" on center. Cavity to be filled with $3^1/_2$" mineral wool insulation.	—	—	—	$4^3/_4$
	15-1.16[q]	2" × 6" wood studs at 24" centers with double top plates, single bottom plate; interior and exterior side covered with two layers o ^{5}f/8" Type X gypsum wallboard, 4′ wide, applied horizontally with vertical joints over studs. Base layer fastened with $2^1/_4$" Type S drywall screws, spaced 24" on center and face layer fastened with Type S drywall screws, spaced 8" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound. Cavity to be filled with $5^1/_2$" mineral wool insulation.	—	—	8	—
	15-2.1[q]	$3^5/_8$" No. 16 gage steel studs at 24" on center or 2" × 4" wood studs at 24" on center. Metal lath attached to the exterior side of studs with minimum 1" long No. 6 drywall screws at 6" on center and covered with minimum $^3/_4$" thick Portland cement plaster. Thin veneer brick units of clay or shale complying with C1157/C1157M–2017, Grade TBS or better, installed in running bond in accordance with Section 1404.10. Combined total thickness of the Portland cement plaster, mortar and thin veneer brick units shall be not less than $1^3/_4$". Interior side covered with one layer of $^5/_8$"-thick Type X gypsum wallboard attached to studs with 1" long No. 6 drywall screws at 12" on center.	—	—	—	6
	15-2.2[q]	$3^5/_8$" No. 16 gage steel studs at 24" on center or 2" × 4" wood studs at 24" on center. Metal lath attached to the exterior side of studs with minimum 1" long No. 6 drywall screws at 6" on center and covered with minimum $^3/_4$" thick Portland cement plaster. Thin veneer brick units of clay or shale complying with C1157/C1157M–2017, Grade TBS or better, installed in running bond in accordance with Section 1404.10. Combined total thickness of the Portland cement plaster, mortar and thin veneer brick units shall be not less than 2". Interior side covered with two layers of $^5/_8$"-thick Type X gypsum wallboard. Bottom layer attached to studs with 1"-long No. 6 drywall screws at 24" on center. Top layer attached to studs with $1^5/_8$"-long No. 6 drywall screws at 12" on center.	—	—	$6^7/_8$	—
	15-2.3[q]	$3^5/_8$" No. 16 gage steel studs at 16" on center or 2" × 4" wood studs at 16" on center. Where metal lath is used, attach to the exterior side of studs with minimum 1"-long No. 6 drywall screws at 6" on center. Brick units of clay or shale not less than $2^5/_8$" thick complying with C270–14a installed in accordance with Section 1404.6 with a minimum 1" airspace. Interior side covered with one layer of $^5/_8$"-thick Type X gypsum wallboard attached to studs with 1"-long No. 6 drywall screws at 12" on center.	—	—	—	$7^7/_8$
	15-2.4[q]	$3^5/_8$" No. 16 gage steel studs at 16" on center or 2" × 4" wood studs at 16" on center. Where metal lath is used, attach to the exterior side of studs with minimum 1"-long No. 6 drywall screws at 6" on center. Brick units of clay or shale not less than $2^5/_8$" thick complying with C270–14a installed in accordance with Section 1404.6 with a minimum 1" airspace. Interior side covered with two layers of $^5/_8$"-thick Type X gypsum wallboard. Bottom layer attached to studs with 1"-long No. 6 drywall screws at 24" on center. Top layer attached to studs with $1^5/_8$"-long No. 6 drywall screws at 12" on center.	—	—	$8^1/_2$	—
16. Exterior walls rated for fire resistance from the inside only in accordance with Section 705.5.	16-1.1[q]	2" × 4" wood studs at 16" centers with double top plates, single bottom plate; interior side covered with $^5/_8$" Type X gypsum wallboard, 4' wide, applied horizontally unblocked, and fastened with $2^1/_4$" Type S drywall screws, spaced 12" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound. Exterior covered with $^3/_8$" wood structural panels, applied vertically, horizontal joints blocked and fastened with 6d common nails (bright)–12" on center in the field, and 6" on center panel edges. Cavity to be filled with $3^1/_2$" mineral wool insulation. Rating established for exposure from interior side only.	—	—	—	$4^1/_2$
	16-1.2[q]	2" × 6" wood studs at 16" centers with double top plates, single bottom plate; interior side covered with $^5/_8$" Type X gypsum wallboard, 4' wide, applied horizontally or vertically with vertical joints over studs and fastened with $2^1/_4$" Type S drywall screws, spaced 12" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound, exterior side covered with $^7/_{16}$" wood structural panels fastened with 6d common nails (bright) spaced 12" on center in the field and 6" on center along the panel edges. Cavity to be filled with $5^1/_2$" mineral wool insulation. Rating established from the gypsum-covered side only.	—	—	—	$6^9/_{16}$
	16-1.3[q]	2" × 6" wood studs at 16" centers with double top plates, single bottom plates; interior side covered with $^5/_8$" Type X gypsum wallboard, 4'wide, applied vertically with all joints over framing or blocking and fastened with $2^1/_4$" Type S drywall screws spaced 7" on center. Joints to be covered with tape and joint compound. Exterior covered with $^3/_8$" wood structural panels, applied vertically with edges over framing or blocking and fastened with 6d common nails (bright) at 12" on center in the field and 6" on center on panel edges. R-19 mineral fiber insulation installed in stud cavity. Rating established from the gypsum-covered side only.	—	—	—	$6^1/_2$

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Thickness shown for brick and clay tile is nominal thicknesses unless plastered, in which case thicknesses are net. Thickness shown for concrete masonry and clay masonry is equivalent thickness defined in Section 722.3.1 for concrete masonry and Section 722.4.1.1 for clay masonry. Where all cells are solid grouted or filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, the equivalent thickness shall be the thickness of the block or brick using specified dimensions as defined in Chapter 21. Equivalent thickness shall include the thickness of applied plaster and lath or gypsum wallboard, where specified.

c. For units in which the net cross-sectional area of cored brick in any plane parallel to the surface containing the cores is not less than 75 percent of the gross cross-sectional area measured in the same plane.

d. Shall be used for nonbearing purposes only.

e. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surface is covered with not less than $^1/_{16}$-inch gypsum veneer plaster.

f. The fire-resistance time period for concrete masonry units meeting the equivalent thicknesses required for a 2-hour fire-resistance rating in Item 3, and having a thickness of not less than $7^5/_8$ inches is 4 hours where cores that are not grouted are filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, sand or slag having a maximum particle size of $^3/_8$ inch.

g. The fire-resistance rating of concrete masonry units composed of a combination of aggregate types or where plaster is applied directly to the concrete masonry shall be determined in accordance with ACI 216.1/TMS 0216. Lightweight aggregates shall have a maximum combined density of 65 pounds per cubic foot.

h. See Note b. The equivalent thickness shall be permitted to include the thickness of cement plaster or 1.5 times the thickness of gypsum plaster applied in accordance with the requirements of Chapter 25.

i. Concrete walls shall be reinforced with horizontal and vertical temperature reinforcement as required by Chapter 19.

j. Studs are welded truss wire studs with 0.18 inch (No. 7 B.W. gage) flange wire and 0.18 inch (No. 7 B.W. gage) truss wires.

k. Nailable metal studs consist of two channel studs spot welded back to back with a crimped web forming a nailing groove.

l. Wood structural panels shall be permitted to be installed between the fire protection and the wood studs on either the interior or exterior side of the wood frame assemblies in this table, provided that the length of the fasteners used to attach the fire protection is increased by an amount not less than the thickness of the wood structural panel.

m. For studs with a slenderness ratio, l_e/d, greater than 33, the design stress shall be reduced to 78 percent of allowable F'_c. For studs with a slenderness ratio, l_e/d, not exceeding 33, the design stress shall be reduced to 78 percent of the adjusted stress F'_c calculated for studs having a slenderness ratio l_e/d of 33.

n. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

o. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA 600 shall be accepted as if herein specified.

p. NCMA TEK 5-8A shall be permitted for the design of fire walls.

q. The design stress of studs shall be equal to not more than that obtained with a load duration factor of 1.0~~100 percent of the allowable F'_c~~ calculated in accordance with Section 2306.

Reason: The change in footnote q is only desired in order to clarify the existing provision. This is the only change presented here.
The current wording is intended to not allow a load duration factor associated with shorter term loading being used, based on the type of loading applied during testing. The current wording of footnote q does not make it readily apparent that this is the intent, and is not coordinated with the terminology used for structural wood design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simply clarification of what is existing

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 721.1(2) RATED FIRE-RESISTANCE PERIODS FOR VARIOUS WALLS AND PARTITIONS

q. ~~The design stress of studs shall be equal to not more than that obtained with a load duration factor of 1.0 calculated in accordance with Section 2306.~~ <u>The studs in this assembly can be designed without fire-related capacity reductions</u>.

Committee Reason: The committee determined the modification clarifies what was initially proposed and helps explain footnote q. The proposal does not change the technical content of the note. It clarifies the requirements. (Vote: 12-0)

Final Hearing Results

FS99-21	AM

FS100-21

Original Proposal

IBC: TABLE 721.1(3)

Proponents: David Tyree, AWC (dtyree@awc.org); Jason Smart, American Wood Council, AWC (jsmart@awc.org)

2021 International Building Code

Revise as follows:

TABLE 721.1(3) MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a, q]

Portions of table not shown remain unchanged.

31. Wood I-joist (minimum I-joist depth $9^1/_4$" with a minimum flange thickness of $1^1/_2$" and a minimum flange cross-sectional area of 2.25 square inches; minimum web thickness of $^3/_8$") @ 24" o.c.	31-1.1	Two layers of $^1/_2$" Type C gypsum wallboard applied with the long dimension perpendicular to the I-joists with end joints staggered. The base layer is fastened with 1" Type S drywall screws spaced 12" o.c. and the face layer is fastened with $1^5/_8$" Type S drywall screws spaced 12" o.c. in the field and 8" o.c. on the edges. Face layer edge joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24" from base layer joints. End joints centered on bottom flange of I-joists and offset a minimum of 48 inches from those of base layer. Face layer to also be attached to base layer with $1^1/_2$" Type G drywall screws spaced 8" o.c. with a 4" stagger, placed 6" from face layer end joints. Face layer wallboard joints taped and covered with joint compound. Screw heads covered with joint compound.	-	-	Varies	-	-	-

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3,

1 pound per square inch = 6.895 kPa, 1 pound per linear foot = 1.4882 kg/m.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Where the slab is in an unrestrained condition, minimum reinforcement cover shall be not less than $1^5/_8$ inches for 4 hours (siliceous aggregate only); $1^1/_4$ inches for 4 and 3 hours; 1 inch for 2 hours (siliceous aggregate only); and$^3/_4$ inch for all other restrained and unrestrained conditions.

c. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinfoa.

   Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.rced and the entire surface is covered with not less than $^1/_{16}$-inch gypsum veneer plaster.

d. Slab thickness over steel joists measured at the joists for metal lath form and at the top of the form for steel form units.

e. (a) The maximum allowable stress level for H-Series joists shall not exceed 22,000 psi.

   (b) The allowable stress for K-Series joists shall not exceed 26,000 psi, the nominal depth of such joist shall be not less than 10 inches and the nominal joist weight shall be not less than 5 pounds per linear foot.

f. Cement plaster with 15 pounds of hydrated lime and 3 pounds of approved additives or admixtures per bag of cement.

g. Gypsum wallboard ceilings attached to steel framing shall be permitted to be suspended with $1^1/_2$-inch cold-formed carrying channels spaced 48 inches on center, that are suspended with No. 8 SWG galvanized wire hangers spaced 48 inches on center. Cross-furring channels are tied to the carrying channels with No. 18 SWG galvanized wire hangers spaced 48 inches on center. Cross-furring channels are tied to the carrying channels with No. 18 SWG galvanized wire (double strand) and spaced as required for direct attachment to the framing. This alternative is applicable to those steel framing assemblies recognized under Note q.

h. Six-inch hollow clay tile with 2-inch concrete slab above.

i. Four-inch hollow clay tile with $1^1/_2$-inch concrete slab above.

j. Thickness measured to bottom of steel form units.

k. Five-eighths inch of vermiculite gypsum plaster plus $^{1}/_{2}$ inch of approved vermiculite acoustical plastic.

l. Furring channels spaced 12 inches on center.

m. Double wood floor shall be permitted to be either of the following:

   (a) Subfloor of 1-inch nominal boarding, a layer of asbestos paper weighing not less than 14 pounds per 100 square feet and a layer of 1-inch nominal tongue-and-groove finished flooring.

   (b) Subfloor of 1-inch nominal tongue-and-groove boarding or $^{15}/_{32}$-inch wood structural panels with exterior glue and a layer of 1-inch nominal tongue-and-groove finished flooring or $^{19}/_{32}$-inch wood structural panel finish flooring or a layer of Type I Grade M-1 particleboard not less than $^{5}/_{8}$-inch thick.

n. The ceiling shall be permitted to be omitted over unusable space, and flooring shall be permitted to be omitted where unusable space occurs above.

o. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

p. Thickness measured on top of steel deck unit.

q. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA 600 shall be accepted as if herein specified.

Reason: Fire-resistance-rated wood-frame assemblies can be found in a number of sources including the*IBC*, Underwriters Laboratories (UL) *Fire Resistance Directory*, Intertek Testing Services' *Directory of Listed Products*, and the Gypsum Association's *Fire Resistance Design Manual*. The American Wood Council (AWC) and its members have tested a number of wood-frame fire-resistance-rated assemblies. This proposal is adding another tested assembly which is popular among designers and is being provided for the convenience of the building official. It is the same as Assembly WIJ-1.5 in the American Wood Council's publication titled DCA3 - *Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies*, which may be downloaded from the AWC website. Similar descriptions of successfully tested I-joist floor assemblies are provided in Table 721.1(3) for one-hour and two-hour fire-resistance-rated floor/ceiling assemblies. I-joists are required to comply with ASTM D5055, *Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.*

Bibliography: DCA3 – *Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies*, American Wood Council, 2020, https://awc.org/pdf/codes-standards/publications/dca/AWC_DCA3_20200401_AWCWebsite.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal provides the IBC with another tested floor assembly for use by designers and building department personnel.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal provides the designer another option for minimum protection for floor and roof systems. (Vote: 11-0)

Final Hearing Results

FS100-21 AS

FS102-21

Original Proposal

IBC: TABLE 722.2.1.4(1), TABLE 722.2.1.4(2)

Proponents: Jeffrey Grove, Jensen Hughes, Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

TABLE 722.2.1.4(1) MULTIPLYING FACTOR FOR FINISHES ON NONFIRE-EXPOSED SIDE OF CAST-IN-PLACE OR PRECAST CONCRETE WALL

TYPE OF FINISH APPLIED TO CONCRETE OR CONCRETE MASONRY WALL	TYPE OF AGGREGATE USED IN CONCRETE OR CONCRETE MASONRY			
	Concrete: siliceous or carbonate concrete masonry: siliceous or carbonate; solid claybrick	Concrete: sand-lightweight concrete masonry: clay tile; hollow clay brick; concrete masonry units of expanded shale and < 20% sand	Concrete: lightweight concrete masonry: concrete masonry units of expanded shale, expanded clay, expanded slag, or pumice < 20% sand	Concrete masonry: concrete masonry units of expanded slag, expanded clay, or pumice
Portland cement-sand plaster	1.00	0.75[a]	0.75[a]	0.50[a]
Gypsum-sand plaster	1.25	1.00	1.00	1.00
Gypsum-vermiculite or perlite plaster	1.75	1.50	1.25	1.25
Gypsum wallboard	3.00	2.25	2.25	2.25

For SI: 1 inch = 25.4 mm.

a. For Portland cement-sand plaster $^5/_8$ inch or less in thickness and applied directly to the concrete or concrete masonry on the nonfire-exposed side of the wall, the multiplying factor shall be 1.00.

TABLE 722.2.1.4(2) TIME ASSIGNED TO FINISH MATERIALS ON FIRE-EXPOSED SIDE OF CAST-IN-PLACE OR PRECAST CONCRETE WALL

FINISH DESCRIPTION	TIME[b] (minutes)
Gypsum wallboard	
$^3/_8$ inch	10
$^1/_2$ inch	15
$^5/_8$ inch	20
2 layers of $^3/_8$ inch	25
1 layer of $^3/_8$ inch, 1 layer of $^1/_2$ inch	35
2 layers of $^1/_2$ inch	40
Type X gypsum wallboard	
$^1/_2$ inch	25
$^5/_8$ inch	40
Portland cement-sand plaster applied directly to concrete masonry	See Note a
Portland cement-sand plaster on metal lath	
$^3/_4$ inch	20
$^7/_8$ inch	25
1 inch	30
Gypsum sand plaster on $^3/_8$-inch gypsum lath	
$^1/_2$ inch	35
$^5/_8$ inch	40
$^3/_4$ inch	50
Gypsum sand plaster on metal lath	
$^3/_4$ inch	50
$^7/_8$ inch	60
1 inch	80

For SI: 1 inch = 25.4 mm.

a. The actual thickness of Portland cement-sand plaster, provided that it is $^5/_8$ inch or less in thickness, shall be permitted to be included in determining the equivalent thickness of the masonry for use in Table 722.3.2.

b. The time assigned is not a finish rating.

Reason: Design professionals may cite Table 722.2.1.4(2) as justification for the added fire-resistance from one layer of 5/8 inch Type X gypsum wallboard to one side of a wood stud or steel stud wall assembly to increase the overall rating of the assembly by 40 minutes because this is the first table that references gypsum wallboard protection. However, the charging language in Section 722.2.1.4 states these time values are only applicable to cast-in-place or precast concrete walls. Section 722.6 provides more appropriate guidance.
The first part of this proposal is to modify the titles of Tables 722.2.1.4 (1) and 722.2.1.4 (2) and add clarifying language that these tables only apply to cast-in-place and precast concrete walls. This clarification in the title ensures that the reader understands that these time values can only be used for concrete type walls.

The second part of this proposal is to add a note to Table 722.2.1.4 (2) stating that the times found in the table are not associated with the finish ratings, as defined in the front of the UL Fire Resistance Directory. This note was taken directly from Table 722.6.2 (1). UL Designs have shown that the finish rating of 5/8 inch Type X gypsum wallboard is closer to 20-24 minutes rather than the 40 minutes assumed by the client. UL Design U332 states the finish rating of a single layer 5/8 inch Type X gypsum wallboard as 23 minutes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There will be no cost impact associated with this proposal as these changes are clarification in nature.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee has several concerns with modifying table 722.2.1.4(1) title to include " Cast-in-place or precast concrete". CMU is included in the table but is not included in the proposed table title. The change does not correspond with the material shown in table 722.2.1.4(1). The proposal also creates a disconnect with the text in table 722.2.1.4(1). (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Daniel Martin, Jensen Hughes, Jensen Hughes (dmartin@jensenhughes.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

TABLE 722.2.1.4(2) TIME ASSIGNED TO FINISH MATERIALS ON FIRE-EXPOSED SIDE OF WALL[a]

FINISH DESCRIPTION	TIME[b] (minutes)
Gypsum wallboard	
3/8 inch	10
1/2 inch	15
5/8 inch	20
2 layers of 3/8 inch	25
1 layer of 3/8 inch, 1 layer of 1/2 inch	35
2 layers of 1/2 inch	40
Type X gypsum wallboard	
1/2 inch	25
5/8 inch	40
Portland cement-sand plaster applied directly to concrete masonry	See Note ~~a~~c
Portland cement-sand plaster on metal lath	
3/4 inch	20
7/8 inch	25
1 inch	30
Gypsum sand plaster on 3/8-inch gypsum lath	

FINISH DESCRIPTION	TIME (minutes)
1/2 inch	35
5/8 inch	40
3/4 inch	50
Gypsum sand plaster on metal lath	
3/4 inch	50
7/8 inch	60
1 inch	80

For SI: 1 inch = 25.4 mm.

a. This table applies to precast concrete, cast-in-place concrete, or masonry walls.

b. The time assigned is not a finish rating.

~~a~~c. The actual thickness of Portland cement-sand plaster, provided that it is 5/8 inch or less in thickness, shall be permitted to be included in determining the equivalent thickness of the masonry for use in Table 722.3.2.

Commenter's Reason: The intent of the original proposal attempted to accomplish two things: specify that Tables 722.2.1.4(1) and 722.2.1.4(2) were to only be used for concrete and masonry walls and add a note that the time values in Table 722.2.1.4(2) were not actual finish rating times. This was an attempt to limit confusion with wood stud framed walls membrane protection times which are found Table 722.6.2(1). The committee and opposition speakers did not oppose the addition of the finish rating note to the end of the table. Opposition speakers were in favor of adding in the finish rating note to match Table 722.6.2(1). The committee and opposition stated that the proposed title changes did not successfully capture all applicable concrete and masonry wall materials, specifically concrete masonry type materials. This public comment was developed in cooperation with some of those that spoke in opposition to the original proposal. Instead of changing the titles in both tables, this public comment will only modify Table 722.2.1.4(2) by adding a note to clarify its applicability to concrete and concrete masonry based wall construction. The contents of Table 722.2.1.4(1) clearly show its applicability to concrete and masonry wall types and will not be modified. This new note will successfully capture the wall construction materials that were omitted in the original proposal. The finish rating note will remain the same as what was originally proposed. As a formatting clarification, the Note numbering has also been updated.

I urge your support of overturning the committee action of Disapproval and vote for As Modified by this public comment.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
There will be no cost impact associated with this proposal as these changes are clarification in nature.

Final Hearing Results

FS102-21 AMPC1

FS103-21

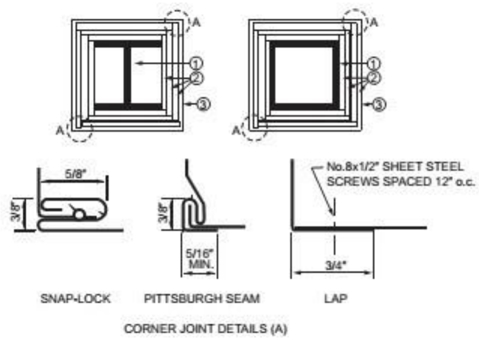
Original Proposal

IBC: FIGURE 722.5.1(2), FIGURE 722.5.1(3), 722.5.1.2.1

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhinternational.com)

2021 International Building Code

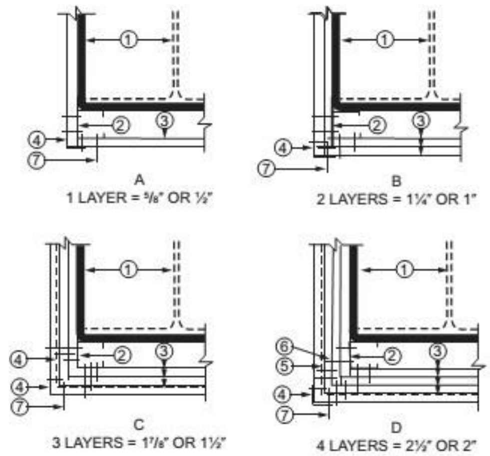
Revise as follows:



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

1. Structural steel column, either wide flange or tubular shapes.
2. Type X ~~gypsum board or~~ gypsum panel products in accordance with ASTM C1177, C1178, C1278, C1396 or C1658. The total thickness of ~~gypsum board or~~ gypsum panel products calculated as *h* in Section 722.5.1.2 shall be applied vertically to an individual column using one of the following methods:
    1. As a single layer without horizontal joints.
    2. As multiple layers with horizontal joints not permitted in any layer.
    3. As multiple layers with horizontal joints staggered not less than 12 inches vertically between layers and not less than 8 feet vertically in any single layer. The total required thickness of ~~gypsum board or~~ gypsum panel products shall be determined on the basis of the specified fire-resistance rating and the weight-to-heated-perimeter ratio (W/D) of the column. For fire-resistance ratings of 2 hours or less, one of the required layers of ~~gypsum board or~~ gypsum panel product may be applied to the exterior of the sheet steel column covers with 1-inch long Type S screws spaced 1 inch from the wallboard edge and 8 inches on center. For such installations, 0.0149-inch minimum thickness galvanized steel corner beads with $1^1/_2$-inch legs shall be attached to the wallboard with Type S screws spaced 12 inches on center.
3. For fire-resistance ratings of 3 hours or less, the column covers shall be fabricated from 0.0239-inch minimum thickness galvanized or stainless steel. For 4-hour fire-resistance ratings, the column covers shall be fabricated from 0.0239-inch minimum thickness stainless steel. The column covers shall be erected with the Snap Lock or Pittsburgh joint details. For fire-resistance ratings of 2 hours or less, column covers fabricated from 0.0269-inch minimum thickness galvanized or stainless steel shall be permitted to be erected with lap joints. The lap joints shall be permitted to be located anywhere around the perimeter of the column cover. The lap joints shall be secured with $^1/_2$-inch-long No. 8 sheet metal screws spaced 12 inches on center. The column covers shall be provided with a minimum expansion clearance of $^1/_8$ inch per linear foot between the ends of the cover and any restraining construction.

FIGURE 722.5.1(2) GYPSUM-PROTECTED STRUCTURAL STEEL COLUMNS WITH SHEET STEEL COLUMN COVERS



For SI: 1 inch = 25.4 mm, 1 foot = -305 mm.

1. Structural steel column, either wide flange or tubular shapes.
2. $1^5/_8$-inch deep studs fabricated from 0.0179-inch minimum thickness galvanized steel with $1^5/_{16}$ or $1^7/_{16}$-inch legs. The length of the steel studs shall be $^1/_2$ inch less than the height of the assembly.
3. Type X ~~gypsum board or~~ gypsum panel products in accordance with ASTM C1177, C1178, C1278, C1396 or C1658. The total thickness of ~~gypsum board or~~ gypsum panel products calculated as *h* in Section 722.5.1.2 shall be applied vertically to an individual column using one of the following methods:
    1. As a single layer without horizontal joints.
    2. As multiple layers with horizontal joints not permitted in any layer.
    3. As multiple layers with horizontal joints staggered not less than 12 inches vertically between layers and not less than 8 feet vertically in any single layer. The total required thickness of ~~gypsum board or~~ gypsum panel products shall be determined on the basis of the specified fire-resistance rating and the weight-to-heated-perimeter ratio (W/D) of the column.
4. Galvanized 0.0149-inch minimum thickness steel corner beads with $1^1/_2$- inch legs attached to the ~~gypsum board or~~ gypsum panel products with 1-inch-long Type S screws spaced 12 inches on center.
5. No. 18 SWG steel tie wires spaced 24 inches on center.
6. Sheet metal angles with 2-inch legs fabricated from 0.0221-inch minimum thickness galvanized steel.
7. Type S screws, 1 inch long, shall be used for attaching the first layer of ~~gypsum board or~~ gypsum panel product to the steel studs and the third layer to the sheet metal angles at 24 inches on center. Type S screws $1^3/_4$ inches long shall be used for attaching the second layer of ~~gypsum board or~~ gypsum panel product to the steel studs and the fourth layer to the sheet metal angles at 12 inches on center. Type S screws $2^1/_4$ inches long shall be used for attaching the third layer of ~~gypsum board or~~ gypsum panel product to the steel studs at 12 inches on center.

FIGURE 722.5.1(3) GYPSUM-PROTECTED STRUCTURAL STEEL COLUMNS WITH STEEL STUD/SCREW ATTACHMENT SYSTEM

722.5.1.2.1 Attachment. The *~~gypsum board or~~ gypsum panel products* shall be supported as illustrated in either Figure 722.5.1(2) for *fire-resistance ratings* of 4 hours or less, or Figure 722.5.1(3) for *fire-resistance ratings* of 3 hours or less.

Reason: The IBC definitions for gypsum products were revised last cycle to match the correct terms used in industry publications. The definition of Gypsum Panel Product makes it clear that Gypsum Board is a subset of Gypsum Panel Product. As such, this is one of several proposals to remove Gypsum Board throughout the IBC whenever it reads as “Gypsum Board and Gypsum Panel Product” because the first item is a subset of the second item. This proposal covers all instances of the duplication in Chapter 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This simply removes redundant wording from the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal appropriately fixes the code terms to be consistent with the terms used in industry publications. (Vote: 13-0)

Final Hearing Results

FS103-21	AS

FS104-21

Original Proposal

IBC: TABLE 722.6.2(1)

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhinternational.com)

2021 International Building Code

Revise as follows:

TABLE 722.6.2(1) TIME ASSIGNED TO WALLBOARD MEMBRANES ON WOOD FRAME[a, b, c, d ,e]

DESCRIPTION OF FINISH	TIME[e][f] (minutes)
$^{3}/_{8}$-inch wood structural panel bonded with exterior glue	5
$1^{5}/_{32}$-inch wood structural panel bonded with exterior glue	10
$1^{9}/_{32}$-inch wood structural panel bonded with exterior glue	15
$^{3}/_{8}$-inch gypsum wallboard	10
$^{1}/_{2}$-inch gypsum wallboard	15
$^{5}/_{8}$-inch gypsum wallboard	30
$^{1}/_{2}$-inch Type X gypsum wallboard	25
$^{5}/_{8}$-inch Type X gypsum wallboard	40
Double $^{3}/_{8}$-inch gypsum wallboard	25
$^{1}/_{2}$-inch + $^{3}/_{8}$-inch gypsum wallboard	35
Double $^{1}/_{2}$-inch gypsum wallboard	40

For SI: 1 inch = 25.4 mm.

a. These values apply only where membranes are installed on framing members that are spaced 16 inches o.c. or less.

b. Gypsum wallboard installed over framing or furring shall be installed so that all edges are supported, except $^{5}/_{8}$-inch Type X gypsum wallboard shall be permitted to be installed horizontally with the horizontal joints staggered 24 inches each side and unsupported but finished.

c. On wood frame floor/ceiling or roof/ceiling assemblies, gypsum board shall be installed with the long dimension perpendicular to framing members and shall have all joints finished.

d. The membrane on the unexposed side shall not be included in determining the fire resistance of the assembly. Where dissimilar membranes are used on a wall assembly, the calculation shall be made from the least fire-resistant (weaker) side.

e. *Fire-resistance ratings* calculated for assemblies using this table shall be limited to not more than one hour.~~The time assigned is not a finished rating.~~

f. The time assigned is not a finished rating.

Reason: This proposal inserts language to clarify the use of this table. Although this information is already stated in Section 7.6, it is far removed from the table itself (by 10 pages in the 2018 edition, for example). If a user simply opens the code book to this table, they may miss this important information.
Specifically, this proposal adds the words “on wood frame” to the title, along with a footnote stating the limitations on fire resistance ratings calculated using this table.

Again, this is not new information. It is already in Section 7.6, but needs to be restated in the table for greater visibility.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply adds some clarification to the table with no change in requirements.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee determined clarification is not needed for table 722.6.2(1). The requirements are clarified in Section 722.6.1.1. Section 722.6.1.1 specifies that Fire-resistance ratings calculated for assemblies using the methods in Section 722.6 shall be limited to not more than 1 hour. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 722.6.2(1) TIME ASSIGNED TO WALLBOARD MEMBRANES ON WOOD FRAME[a, b, c, d ~~, e~~]

DESCRIPTION OF FINISH	TIME[~~f~~ e] (minutes)
3/8-inch wood structural panel bonded with exterior glue	5
15/32-inch wood structural panel bonded with exterior glue	10
19/32-inch wood structural panel bonded with exterior glue	15
3/8-inch gypsum wallboard	10
1/2-inch gypsum wallboard	15
5/8-inch gypsum wallboard	30
1/2-inch Type X gypsum wallboard	25
5/8-inch Type X gypsum wallboard	40
Double 3/8-inch gypsum wallboard	25
1/2-inch + 3/8-inch gypsum wallboard	35
Double 1/2-inch gypsum wallboard	40

For SI: 1 inch = 25.4 mm.

a. These values apply only where membranes are installed on framing members that are spaced 16 inches o.c. or less.

b. Gypsum wallboard installed over framing or furring shall be installed so that all edges are supported, except 5/8-inch Type X gypsum wallboard shall be permitted to be installed horizontally with the horizontal joints staggered 24 inches each side and unsupported but finished.

c. On wood frame floor/ceiling or roof/ceiling assemblies, gypsum board shall be installed with the long dimension perpendicular to framing members and shall have all joints finished.

d. The membrane on the unexposed side shall not be included in determining the fire resistance of the assembly. Where dissimilar membranes are used on a wall assembly, the calculation shall be made from the least fire-resistant (weaker) side.

e. ~~*Fire-resistance ratings* calculated for assemblies using this table shall be limited to not more than one hour.~~

e. ~~f.~~ The time assigned is not a finished rating.

Commenter's Reason: This proposal is necessary to address confusion with the application of this table. We often receive calls from people trying to apply this table to assemblies other than wood.
This public comment deletes the new footnote proposed in the original proposal, based on conversations with opponents. The text of 722.6 already contains this information, so it is not necessary to repeat it here in the table.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction

This public comment and code change are simply a clarification, with no impact on cost.

Final Hearing Results

FS104-21	AMPC1

FS105-21

Original Proposal

IBC: TABLE 722.6.2(3)

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Building Code

Revise as follows:

TABLE 722.6.2(3) MEMBRANE[a] ON EXTERIOR FACE OF WOOD STUD WALLS

SHEATHING	PAPER	EXTERIOR FINISH
5/8-inch T & G lumber 5/16-inch exterior glue *wood structural panel* 1/2-inch gypsum wallboard 5/8-inch gypsum wallboard 1/2-inch fiberboard	Sheathing paper	Lumber siding Wood shingles and shakes 1/4-inch *fiber-cement* lap, panel or shingle siding 1/4-inch *wood structural panels*-exterior type 1/4-inch hardboard <u>Insulated Vinyl Siding</u> Metal siding <u>Polypropylene Siding</u> Stucco on metal lath Masonry veneer Vinyl siding
None	—	3/8-inch exterior-grade *wood structural panels*

For SI: 1 inch = 25.4 mm.

a. Any combination of sheathing, paper and exterior finish is permitted.

Reason: This change adds two additional products, insulated vinyl siding and polypropylene siding, as options for choice as exterior finishes for the fire rating of calculated wood framed wall assemblies. Since the code allows any choice of products as noted in footnote a, it's worth listing these products to provide specifiers with additional options.
This list is for products that are on the outside of the assembly and the fire rating is from the inside in this section. So material choice is not necessarily relevant.

As further evidence, both products being proposed for addition have shown to be allowed as part of ASTM E119 rated assemblies and although it is not directly relevant here, it does support that they are safe to use with rated assemblies.

Finally, the acceptance of these code approved products are in line with fire rating performance principals based on Hermathy's Rule that note the addition of layers of materials will not decrease the the fire rating of assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply provides more material choice options.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement. (Vote: 10-1)

Final Hearing Results

FS105-21	AS

FS106-21

Original Proposal

IBC: TABLE 722.6.2(5)

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., representing North American Insulation Manufacturers Association (NAIMA)

2021 International Building Code

Revise as follows:

TABLE 722.6.2(5) TIME ASSIGNED FOR ADDITIONAL PROTECTION

DESCRIPTION OF ADDITIONAL PROTECTION	FIRE RESISTANCE (minutes)
Add to the fire-resistance rating of wood stud walls if the spaces between the studs are completely filled with glass fiberor mineral wool batts weighing not less than 2 pounds per cubic foot (0.6 pound per square foot of wall surface) or rockwool or slag material wool batts weighing not less than 3.3 pounds per cubic foot (1 pound per square foot of wall surface)o, r cellulose insulation having a nominal density not less than 2.6 pounds per cubic foot.	15

For SI: 1 pound/cubic foot = 16.0185 kg/m^3.

Reason: This code change updates the Table to equate the required minimum density for glass fiber and rock and slag wool fiber insulations. Since both have been included in the design currently, it is not necessary to retain the old minimum density value for rockwool and slag wool batts.
Current rock and slag wool insulation products are available at the 2 pcf density.

Cost Impact: The code change proposal will decrease the cost of construction
The code change will reduce the cost of construction where mineral wool is used.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal appropriately updates Table 722.6.2(5) to equate the required minimum density for glass fiber and rock and slag wool fiber insulations. (Vote: 12-1)

Final Hearing Results

FS106-21 AS

FS110-21

Original Proposal

IBC: 909.20.1; IFC: [BF] 909.20.1

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

Revise as follows:

909.20.1 Access. Access to the *stairway* or *ramp* shall be by way of a vestibule or an open exterior balcony. The minimum dimension of the vestibule shall be not less than the required width of the *corridor* leading to the vestibule but shall not have a clear width of less than 44 inches (1118 mm) and shall not have a length of less than 72 inches (1829 mm) in the direction of egress travel into the stairway between the centerline of the doorways into the vestibule and stairway.

Reason: This proposal resubmits FS-142-15 that was narrowly defeated during the online governmental voting process 94-59 and failed to gain 2/3 of the vote (report of hearings and voting results attached). The Fire Safety committee disapproval was due to poor figures (figures attached to this proposal were provided for PCH) in the original submittal and due to their belief was that the issue can be resolved with figures in the commentary. The commentary hints at what the code change proposal is after however ICC repeatedly states that the commentary is not the code. Speakers in opposition raised issues related to ADA and accessibility that were later found to be inaccurate. The assembly in Long Beach approved the code change however the OGV process was new at the time and we failed to mobilize the vote.

The proposed code change seeks to clarify the dimensional requirements in vestibules used to access stairway doors in smoke proof enclosures. A smoke proof enclosure is an interior exit stairway that is protected with a two-hour fire barrier and includes a vestibule separating the occupied story from the stairway. The vestibule seeks to keep smoke from migrating into the stairway portion due to egress by occupants and due to fire fighting operations. The dimensional requirements for the vestibule seek to allow sufficient distance between the doorway into the vestibule and into the stairway such that both doorways are not open at the same time. Additionally, the vestibule provides fire fighters with a safe area to attack a fire on the fire floor without compromising the smoke proof integrity of the stairway.

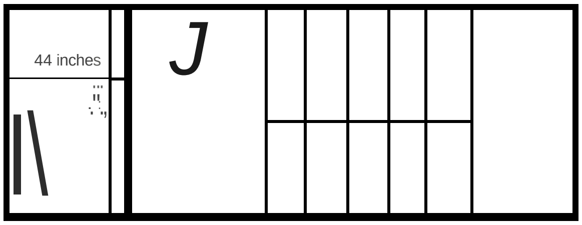
Both the handbook and the commentary conservatively dimension the 72 inch dimension to be perpendicular to the access doorway into the stairway from the vestibule. If the two doorways are not in line, offset or perpendicular to one another the direction of travel into the vestibule, within the vestibule and into the stairway can change and it does not appear reasonable to require 72 inch by 72 inch vestibules if sufficient space is provided to clear the doorways arcs.

The code change also requires that the 44 inch width be a clear width for consistency with the requirements in Section 1003.3.3 in the event a standpipe is placed within the vestibule or pressurization ductwork is located within the vestibule.

We hope that the Fire Safety can approve this clarifying code change that is reflective of current practice in California.

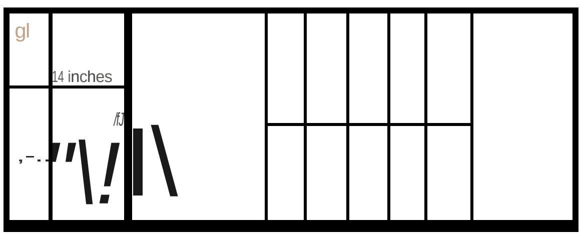
FS 142-15 Figure A

2015 IBC Code Complying



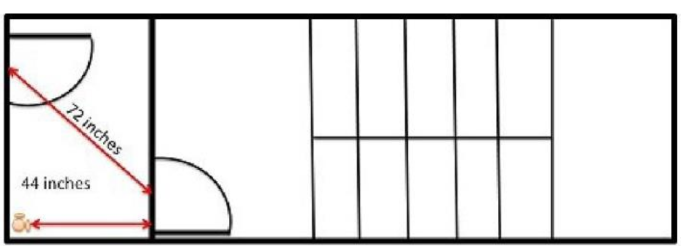
FS 142-15 Figure B

2015 IBC Code Complying

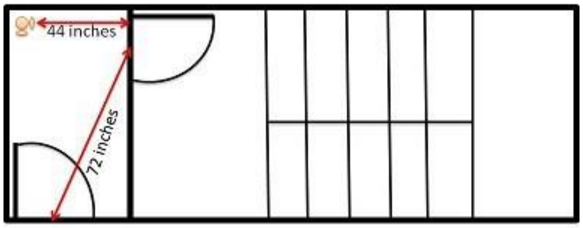


FS 142-15 Figure C

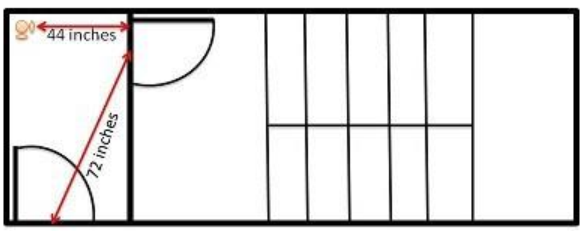
Proposed Code Change



FS 142-15 Figure D
Proposed Code Change



FS 142-15 Figure E
Proposed Code Change



Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change results in a re-arrangement of doors and does not increase the size of the vestibule, the length of walls or number or fire resistance rating for the doorways. It is not known if it will increase the cost of construction due to building layout issues, this is not determinate.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

909.20.1Access.
Access to the *stairway* or *ramp* shall be by way of a vestibule or an open exterior balcony. The minimum dimension of the vestibule shall be not less than the required width of the *corridor* leading to the vestibule but shall not have a clear width of less than 44 inches (1118 mm) and shall not have a length of less than 72 inches (1829 mm) in the direction of egress travel into the stairway<u>, measured in a straight line</u> between the centerline of the doorways into the vestibule and stairway.

Committee Reason: The committee determined the modification clarifies how to measure a length of less than 72" by adding " measured in a straight line". The proposal clarifies the size of a vestibule. (Vote: 13-0)

Final Hearing Results

FS110-21 AM

FS112-21

Original Proposal

IBC: 909.20, 909.20.4, 909.20.4.1, 909.20.4.2, 909.20.4.2.1, 909.20.4.3, 909.20.4.4, 909.20.7; IFC: [BF] 909.20, [BF] 909.20.4, [BF] 909.20.4.1, [BF] 909.20.4.2, [BF] 909.20.4.2.1, [BF] 909.20.4.3, [BF] 909.20.4.4

Proponents: Valarie Evans, SNICC, SNBO (evansv@cityofnorthlasvegas.com)

2021 International Building Code

Revise as follows:

909.20 Smokeproof enclosures. Where required by Section 1023.12, a *smokeproof enclosure* shall be constructed in accordance with this section. A *smokeproof enclosure* shall consist of an *interior exit stairway* or *ramp* that is enclosed in accordance with the applicable provisions of Section 1023 and an open exterior balcony, ~~ventilated vestibule~~ or pressurized *stair* and pressurized entrance vestibule meeting the requirements of this section. Where access to the roof is required by the *International Fire Code*, such access shall be from the *smokeproof enclosure* where a *smokeproof enclosure* is required.

Delete without substitution:

~~**909.20.4 Mechanical ventilation alternative.** The provisions of Sections 909.20.4.1 through 909.20.4.4 shall apply to ventilation of *smokeproof enclosures* by mechanical means.~~

~~**909.20.4.1 Vestibule doors.** The door assembly from the building into the vestibule shall be a *fire door assembly* complying with Section 716.2.2.1. The door assembly from the vestibule to the *stairway* or *ramp* shall not have less than a 20-minute *fire protection rating* and shall meet the requirements for a smoke door assembly in accordance with Section 716.2.2.1. The door shall be installed in accordance with NFPA 105.~~

~~**909.20.4.2 Vestibule ventilation.** The vestibule shall be supplied with not less than one air change per minute and the exhaust shall be not less than 150 percent of supply. Supply air shall enter and exhaust air shall discharge from the vestibule through separate, tightly constructed ducts used only for that purpose. Supply air shall enter the vestibule within 6 inches (152 mm) of the floor level. The top of the exhaust register shall be located at the top of the smoke trap but not more than 6 inches (152 mm) down from the top of the trap, and shall be entirely within the smoke trap area. Doors in the open position shall not obstruct duct openings. Duct openings with controlling *dampers* are permitted where necessary to meet the design requirements, but *dampers* are not otherwise required.~~

~~**909.20.4.2.1 Engineered ventilation system.** Where a specially engineered system is used, the system shall exhaust a quantity of air equal to not less than 90 air changes per hour from any vestibule in emergency operation mode and shall be sized to handle three vestibules simultaneously. Smoke detectors shall be located at the floor-side entrance to each vestibule and shall activate the system for the affected vestibule. Smoke detectors shall be installed in accordance with Section 907.3.~~

~~**909.20.4.3 Smoke trap.** The vestibule ceiling shall be not less than 20 inches (508 mm) higher than the door opening into the vestibule to serve as a smoke and heat trap and to provide an upward-moving air column. The height shall not be decreased unless *approved* and justified by design and test.~~

~~**909.20.4.4 Stairway or ramp shaft air movement system.** The *stairway* or *ramp shaft* shall be provided with a dampered relief opening and supplied with sufficient air to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) in the *shaft* relative to the vestibule with all doors closed.~~

Revise as follows:

909.20.7 Ventilating equipment. The activation of ventilating equipment required by the alternatives in Sections ~~**909.20.4,**~~ 909.20.5 and

909.20.6 shall be by smoke detectors installed at each floor level at an *approved* location at the entrance to the *smokeproof enclosure*. When the closing device for the *stairway* and *ramp shaft* and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels. Smoke detectors shall be installed in accordance with Section 907.3.

Reason: This proposal will eliminate the mechanical ventilation alternative. Although the mechanical ventilation alternative has been in the IBC since inception, it seems unlikely this option is used very often, if at all. This is due to the complexity of the design and the additional equipment necessary to achieve the specified results.
There are two primary approaches to meet the mechanical ventilation option. One approach requires large supply and exhaust fans, as well as the associated ducts to serve all vestibules simultaneously. A second approach requires not only the supply and exhaust ducts, but also one supply and one exhaust damper in each vestibule. With this approach, each damper in every vestibule will have to properly configure for the system to function, as well as be monitored to confirm status.

Section 909.20.4.2 requires the vestibule exhaust to be at least 150 percent of supply. This means the vestibule is negative relative to the adjacent floor and smoke can be drawn into the vestibule. As such, this design concept actually contradicts the intent, which is to limit smoke intrusion into the exit enclosure.

Section 909.20.4.3 requires a minimum ceiling height of 20 inches above the door. With a minimum door opening height of 80 inches as required by Section 1010.1.1, these constraints dictate a minimum of 8 feet 4 inches from the top of one slab to the bottom of the slab above. Adding another 6 inches for a reasonable slab thickness gives almost 9 foot slab-to-slab height. Although this may not be a hardship for most multi-story buildings, this will impact some designs.

Cost Impact: The code change proposal will decrease the cost of construction
Due to the complexity of this option, it is more expensive to design, construction, commission, and maintain than other recognized approaches for smokeproof enclosures.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: As stated in the reason statement, the committee determined the proposal eliminates the mechanical ventilation alternative due to the complexity of the design and the additional equipment necessary to achieve the specified results. (Vote: 13-0)

Final Hearing Results

FS112-21 AS

FS115-21

Original Proposal

IBC: 909.20.6.4 (New); IFC: [FS] 909.20.6.4 (New)

Proponents: Jeffrey Grove, Jensen Hughes, Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Add new text as follows:

909.20.6.4 Smoke Detection. The fan system shall be equipped with a smoke detector that will automatically shut down the fan system when smoke is detected within the system.

Reason: Section 909.21.4.2 for elevator pressurization systems requires a smoke detector that will automatically shut down the fans when smoke is detected within the system. The ICC Commentary to this section states:
The airflow must be free of smoke or it will only increase the likelihood of smoke spreading through-out the building. The smoke detector required by this section should be located on the intake side of the blower fan.

NFPA 92, Sections 6.4.6.2 states:

6.4.6.2.1 A smoke detector shall be provided in the air supply to the pressurized stairwell.

6.4.6.2.2 On detection of smoke in the air supply, the supply fan(s) shall be stopped.

The intent of stair pressurization systems is to maintain a tenable environment within the stair enclosures to exit discharge. A fire on the roof or in the fan, can result in smoke entering the stair enclosure.

To maintain consistency with NFPA 92, smoke detection should be provided that at the stair pressurization system.

Cost Impact: The code change proposal will increase the cost of construction
The Cost impact will be nominal per stair pressurization fan, consisting of one duct mounted smoke detector or area detector at the top of the enclosure, and controls.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal provides consistency in the code regarding smoke detection requirements for pressurization systems. (Vote: 13-0)

Final Hearing Results

FS115-21	AS

FS116-21

Original Proposal

IBC: 909.21; IFC: [BF] 909.21

Proponents: Jeffrey Grove, Jensen Hughes, Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

909.21 Elevator hoistway pressurization alternative. Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with Sections 909.21.1 through 909.21.11. <u>The design shall consider the interaction effects of the operation of multiple smoke control systems for all design scenarios in accordance with Section 909.4.7. All components/systems associated with the means of mitigating adverse interaction shall comply with the applicable Sections of 909.</u>

Reason: Multiple published papers identify how elevator hoistway pressurization systems will impact other smoke controls systems serving high-rise buildings, including stair pressurization. Due to the high leakage factors of both open and closed elevator doors, a large volume of airflow must be introduced into the elevator hoistway to maintain the prescribed +0.10 inches of water (25 Pa) for elevator pressurization systems on all levels. As documented in the referenced papers, unless, the air introduced into the building by the elevator pressurization is relieved to the exterior, the prescribed pressures cannot be maintained to the pressurized stair enclosures With the low exterior leakage factor of modern buildings to meet energy code requirements, this issue is further compounded.
The means of relieving the air can either mechanical systems or relief dampers at the exterior of the building. The volume of air must be calculated using smoke control models such as CONTAM.

While Section 909.4.7 specifically requires the engineer to consider the interaction of multiple systems, the need should be emphasized when the building is the building utilizes elevator pressurization to protect the hoistway. As the components/systems utilized to mitigate the impact are critical to the functionality of the system, the language simply clarifies the entire system must comply with the provisions of Section 909.

Bibliography: D.C. Bowers, J.R. Ellison, D.E. Beasley and R.S. Miller: Department of Mechanical EngineeringClemson University. The 8th International Conference on Performance-Based Codes and FireSafety Design Methods, Society of Fire Protection Engineers, Numerical Study of Elevator and Stairwell Pressurization Systems Using Detailed Building Models: Lund, Sweden; , June 16-18, 2010
Miller, R.S. and Beasley, D.E., Smoke Control by Pressurization in Stairwells and Elevator Shafts, The Singapore Engineer, 6-11, February 2009

Miller, R.S. and Beasley, D.E., On Stairwell and Elevator Shaft Pressurization for Smoke

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are number of variables that determine the relief required and the method of providing the relief is dependent upon the architectural features of the building. This proposed change is only intended to provide clarification to other provisions of the Code

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal provides an appropriate pointer to section 909.4.7 and considers all design scenarios. (Vote: 13-0)

Final Hearing Results

FS116-21	AS

FS118-21

Original Proposal

IBC: 909.21.6; IFC: [BF] 909.21.6

Proponents: Jeffrey Grove, Jensen Hughes, Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

909.21.6 Activation of pressurization system. The elevator pressurization system shall be activated upon activation of ~~either the building fire alarm system or~~ the elevator lobby smoke detectors. ~~Where both a building fire alarm system and elevator lobby smoke detectors are present, each shall be independently capable of activating the pressurization system.~~

Reason: 1. Section 909.21.1 of the IBC requires the elevator hoistways to be pressurized to*maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed*. Section 909.21.1 requires the opening and closing of hoistway doors at each level to be demonstrated as part of the testing process.
Section 3003.2 of the IBC states: *Elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1/CSA B44*.

ANSI/ASME A17.1, Section 2.27.3.2.1 (2013 and 2016 Editions) states:

In jurisdictions not enforcing the NBCC, smoke detectors or other automatic fire detectors in environments not suitable for smoke detectors (fire alarm initiating devices) used to initiate Phase I Emergency Recall Operation shall be installed in conformance with the requirements of NFPA 72, and shall be located

(a) at each elevator lobby served by the elevator

(b) In the associated elevator machine room, machinery space containing a motor controller or driving machine, control space, or control room

(c) In the elevator hoistway, when sprinklers are located in those hoistways

2. Section 21.3.3 of NFPA 72 (2013 through 2019 Editions) states: *Unless otherwise required by the authority having jurisdiction, only the elevator lobby, elevator hoistway, and elevator machine room smoke detectors, or other automatic fire detection as permitted by 21.3.7, and initiating devices used to initiate shutdown of elevator power in accordance with Section 21.4 shall be used to recall elevators for fire fighters' service*.

As 909.21.1 states the pressures are to be measured when the elevators cars are open on the floor of recall, and 909.21.6 requires both lobby smoke detectors and any building alarm to activate the elevator pressurization, this would suggest that any alarm would be required to recall the elevators. As noted above, ASME A17.1 and NFPA 72 only permits elevator recall upon activation of elevator lobby smoke detector, elevator machine room smoke detector, or a smoke detector located within the elevator hoistway.

3. Open elevator doors on the floor of recall can discharge approximately 6,000 cfm per door which can equate up to a 24,000-cfm loss for a four-car elevator hoistway. As IBC Section 909.21 requires the pressures to be measured when the elevators are on the floor of recall, this loss of air must be considered when calculating the fan size to maintain the pressures as prescribed in Section 909.21.

When the elevator pressurization system activates upon receipt of an alarm signal from a fire alarm initiating device that does not activate recall operations, the pathway to relieve the air is significantly restricted and will result in over-pressurizing the hoistway, thereby exceeding the prescribed pressure differentials. In addition, when an elevator door is opened to load or unload occupants, the open door provides a pathway that can cause an opposing force on the elevator door, thereby preventing the door from re-closing. In all cases, the variance between recall and non-recall operation will adversely impact the performance of the elevator pressurization system. The severity

of the impact is dependent upon a number of variables. These include the following:· The size of the pressurization fan.· The height of the hoistway.· The size of the hoistway (number of cars).· The location of the elevator cars at the time of alarm.· The number of elevator cars open and closed. When elevators are not in recall operation, they are generally constantly moving throughout the building with doors opening and closing. There is not an effective or repeatable method of designing the elevator pressurization to consider all of these variables. 4. Depending on the occupancy type, the quantity of manual or automatic fire alarm initiating devices that will recall the elevators can represent a small percentage of the total number devices. 5. When hoistway opening protection is provided utilizing an enclosed elevator lobby in accordance with Section 3006.3, the elevator lobby doors are generally provided with automatic closing devices (magnetic hold-open devices) that release in accordance with Section 907.3. Section 907.3 references NFPA 72 for the requirements to release the doors. NFPA 72 Section 17.7.5.6 (*Smoke Detectors for Door Release Service)* only requires the detector to be within 5 feet of the respective door to release the door. The Code does not require any building alarm to release all of the doors on all floors. The requirement for activating the elevator pressurization should be the same as the other means of providing opening protection for the hoistway.
The fundamental intent of elevator hoistway pressurization is to provide an alternate means of opening protection for the elevator shaft enclosure to prevent smoke migration. The smoke detector in the lobby will activate prior to any significant amount of smoke entering into the hoistway. When these detectors initiate an alarm, the elevators will recall, and elevator pressurization system will activate to mitigate smoke migration in the hoistway.

Cost Impact: The code change proposal will decrease the cost of construction
Implementing this code change will reduce cost to design and construct a means of attempting to mitigate the impact of the elevators in recall and normal operation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the elevator lobby smoke detector alone can activate the elevator pressurization system. The deletion is consistent with ANSI/ASME A17.1. (Vote: 12-1)

Final Hearing Results

FS118-21	AS

FS119-21

Original Proposal

IBC: 910.2.1; IFC: 910.2.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Building Code

Revise as follows:

[F] 910.2.1 Group F-1 or S-1. Smoke and heat vents installed in accordance with Section 910.3 or a mechanical smoke removal system installed in accordance with Section 910.4 shall be installed in buildings and portions thereof used as a Group F-1 or S-1 occupancy having more than 50,000 square feet (4645 m^2) of ~~undivided~~ area undivided by draft curtains 4 feet (1.8 m) or greater in depth or walls constructed in accordance with Sections 706, 707, 708, 709, or 710. In occupied portions of a building equipped throughout with an*automatic sprinkler system* in accordance with Section 903.3.1.1 where the upper surface of the*story* is not a roof assembly, a mechanical smoke removal system in accordance with Section 910.4 shall be installed.

Exception: Group S-1 aircraft repair hangars.

Reason: Per the commentary for 910.2.1, "The code is not clear on what is meant by the term "undivided area." However, the intent is to provide the ability to manage the smoke in large spaces. Draft curtains or potentially any physical separation (regardless of rating) would provide such division." The commentary goes on to specify what constitutes construction that bounds smoke and the passage of smoke and it states that draft curtains are typically 6-feet in depth. NFPA 204, the Standard for Smoke and Heat Venting requires draft curtains to be 20% of the total ceiling height. For example, a 40 ft. ceiling would have an 8 ft. draft curtain, 30 ft. = 6 ft. draft curtain, 20 ft. = 4 ft. draft curtain. Having construction requirements in the commentary is a clear indication that the code text needs some prescriptive requirements. The proposal will provide additional language to section 910.2.1 that clarifies the requirements of what constitutes a divided area by putting requirements on draft curtain depth and the other passive systems found in Chapter 7.

Cost Impact: The code change proposal will increase the cost of construction
This proposal brings clarification to the issue the commentary raises. It could increase the cost of construction where the current code applied undivided area lacks a separation. This proposal provides a prescriptive method to divide the area with code recognized boundaries for smoke and heat vent installations.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approval is based on that the proposal clarifies the section requirements. The addition to the section provides the criteria for how the undivided area is to be determined. (Vote: 13-1)

Final Hearing Results

FS119-21	AS

FS120-21

Original Proposal

IBC: [A] 107.2.4, [A] 110.3.9, SECTION 202, SECTION 1401, 1401.1, SECTION 1402, 1402.1, 1402.2, 1402.5, SECTION 1403, 1403.13, TABLE 1404.3(3), 1404.4, [BS] 1404.17, 1406.8, 1406.12, 2603.5.5, 3113.3

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Marcelo Hirschler, GBH International, self (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

[A] 107.2.4 Exterior wall assembly ~~envelope~~. *Construction documents* for all buildings shall describe the *exterior wall assembly ~~envelope~~* in sufficient detail to determine compliance with this code. The *construction documents* shall provide details of the *exterior wall assembly ~~envelope~~* as required, including flashing, intersections with dissimilar materials, corners, end details, control joints, intersections at roof, eaves or parapets, means of drainage, water-resistive barrier and details around openings.

The *construction documents* shall include manufacturer's installation instructions that provide supporting documentation that the proposed penetration and opening details described in the *construction documents* maintain the weather resistance of the *exterior wall assembly ~~envelope~~*. The supporting documentation shall fully describe the *exterior wall* assembly ~~system~~ that was tested, where applicable, as well as the test procedure used.

[A] 110.3.9 Energy efficiency inspections. Inspections shall be made to determine compliance with Chapter 13 and shall include, but not be limited to, inspections for: building thermal envelope insulation *R*- and *U*-values, *fenestration U*-value, duct system *R*-value, and HVAC and water-heating equipment efficiency.

[BF]
CONTINUOUS INSULATION (ci)

.

Insulating material that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior, or is integral to any opaque surface of the building thermal envelope.

[BF]
EXTERIOR WALL ASSEMBLY ~~ENVELOPE~~

.

A system, ~~or assembly of~~ including the ~~exterior wall,~~ *exterior wall covering*, framing and components, i~~ncluding exterior wall finish materials,~~ such as *weather-resistive barriers*, air barriers, and insulating materials.This system ~~that~~ provides protection of the building structural members~~, including framing and sheathing materials,~~ and conditioned interior space, from the detrimental effects of the exterior environment.

SECTION 1401
GENERAL

Revise as follows:

1401.1 Scope. The provisions of this chapter shall establish the minimum requirements for *exterior walls*; *exterior wall assemblies,* *exterior wall coverings*; *exterior wall* openings; exterior windows and doors; and architectural *trim.*

SECTION 1402
PERFORMANCE REQUIREMENTS

Revise as follows:

1402.1 General. The provisions of this section shall apply to *exterior walls*, *exterior wall coverings* and components thereof.

1402.2 Weather protection. ~~*Exterior walls* shall provide the building~~ Buildings shall be provided with a weather-resistant *exterior wall assembly* ~~*envelope*~~. The *exterior wall assembly* ~~*envelope*~~ shall include flashing, as described in Section 1404.4. The *exterior wall assembly* ~~*envelope*~~ shall be designed and constructed in such a manner as to prevent the accumulation of water within the *exterior wall assembly* by providing a *water-resistive barrier* behind the exterior *veneer*, as described in Section 1403.2, and a means for draining water that enters the assembly to the exterior. Protection against condensation in the *exterior wall assembly* shall be provided in accordance with Section 1404.3.

Exceptions:

1. A weather-resistant *exterior wall assembly* ~~*envelope*~~ shall not be required over concrete or masonry walls designed in accordance with Chapters 19 and 21, respectively.
2. Compliance with the requirements for a means of drainage, and the requirements of Sections 1403.2 and 1404.4, shall not be required for an *exterior wall assembly* ~~*envelope*~~ that has been demonstrated through testing to resist wind-driven rain, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions: The *exterior wall* ~~*envelope*~~ design shall be considered to resist wind-driven rain where the results of testing, in accordance with ASTM E331, indicate that water did not penetrate control joints in the *exterior wall* ~~*envelope*~~, joints at the perimeter of openings or intersections of terminations with dissimilar materials.
   - 2.1. *Exterior wall* ~~*envelope*~~ test assemblies shall include not fewer than one opening, one control joint, one wall/eave interface and one wall sill. Tested openings and penetrations shall be representative of the intended end-use configuration.
   - 2.2. *Exterior wall* ~~*envelope*~~ test assemblies shall be not less than 4 feet by 8 feet (1219 mm by 2438 mm) in size.
   - 2.3. *Exterior wall* ~~*envelope*~~ test assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (0.297 kN/m^2).
   - 2.4. *Exterior wall* ~~*envelope*~~ test assemblies shall be subjected to a minimum test exposure duration of 2 hours.
3. *Exterior insulation and finish systems* (EIFS) complying with Section 1407.4.1.

1402.5 Water-resistive barriers. *Exterior walls* on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. ~~Walls~~ *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has ~~a~~ an *exterior wall covering* of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. ~~Walls~~ *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   - 2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
   - 2.2 A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

SECTION 1403
MATERIALS

Revise as follows:

1403.13 Foam plastic insulation. Foam plastic insulation used in *exterior wall* ~~*covering*~~ *assemblies* shall comply with Chapter 26.

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R2.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R7.5 over 2 × 6 wall
6	Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R7.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R11.25 over 2 × 6 wall
7	Continuous insulation with *R*-value ≥ R10 over 2 × 4 wall Continuous insulation with*R*-value ≥ R15 over 2 × 6 wall
8	Continuous insulation with *R*-value ≥ R12.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R20 over 2 × 6 wall

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the *building thermal envelope* requirements of the International Energy Conservation Code.

1404.4 Flashing. Flashing shall be installed in such a manner so as to prevent moisture from entering the *exterior wall* or to redirect that moisture to the surface of the *exterior wall* covering ~~finish~~ or to a *water-resistive barrier* complying with Section 1403.2 and that is part of a means of drainage complying with Section 1402.2. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of *exterior wall* assemblies, *exterior wall* intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim. Where self-adhered membranes are used as flashings of *fenestration* in *exterior wall assemblies*, those self-adhered flashings shall comply with AAMA 711. Where fluid applied membranes are used as flashing for *exterior wall* openings, those fluid applied membrane flashings shall comply with AAMA 714.

[BS] 1404.17 Fastening. Weather boarding and *exterior wall coverings* shall be securely fastened with aluminum, copper, zinc, zinc-coated or other *approved* corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.2 or the*approved* manufacturer's instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with *approved* mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of *wood structural panels* as specified in Table 2308.6.3(3).

1406.8 Fire-resistance rating. Where MCM systems are used on*exterior walls* required to have a *fire-resistance rating* in accordance with Section 705, evidence shall be submitted to the *building official* that the required *fire-resistance rating* is maintained.

Exception: MCM systems that are part of an*exterior wall* *assembly* ~~*envelope*~~ not containing foam plastic insulation and are installed on the outer surface of a fire-resistance-rated *exterior wall* in a manner such that the attachments do not penetrate through the entire *exterior wall* assembly, shall not be required to comply with this section.

1406.12 Foam plastic insulation. Where MCM systems are included in an *exterior wall* *assembly* ~~envelope~~ containing foam plastic insulation, the *exterior wall* *assembly* ~~envelope~~ shall also comply with the requirements of Section 2603.

2603.5.5 Vertical and lateral fire propagation. The *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exceptions:

1. One-*story* buildings complying with Section 2603.4.1.4.
2. ~~Wall~~ *Exterior wall assemblies* where the foam plastic insulation is covered on each face by not less than 1-inch (25 mm) thickness of masonry or concrete and meeting one of the following:
   2.1. There is no airspace between the insulation and the concrete or masonry.
   2.2. The insulation has a *flame spread index* of not more than 25 as determined in accordance with ASTM E84 or UL 723 and the maximum airspace between the insulation and the concrete or masonry is not more than 1 inch (25 mm).

3113.3 Manufacturer's data plate. Each relocatable module shall have a data plate that is permanently attached on or adjacent to the electrical panel, and shall include the following information:

1. Occupancy group.
2. Manufacturer's name and address.
3. Date of manufacture.
4. Serial number of module.
5. Design *roof live load*, design floor *live load*, snow *load*, wind and seismic design.
6. *Approved* quality assurance agency or *approved* inspection agency.
7. Codes and standards of construction.
8. ~~Envelope thermal~~ Thermal resistance values of the building thermal envelope.
9. Electrical service size.
10. Fuel-burning equipment and size.
11. Special limitations if any.

Reason: The proposed changes above address every instance in the 2021 IBC where the terms "exterior wall", "exterior wall assembly", "exterior wall envelope" and "exterior wall covering" (as well as "thermal envelope" and "building thermal envelope" are used (with some exceptions because the correct term is used and there is no need to look at them in more detail). The proposed changes here are simple clarification, since there is some confusion as to the meaning of the terms, and the proposal does not intend to make any technical changes.
The concept in these proposed changes is that the code should reference the exterior wall unless it refers to a specific issue associated with testing or a similar aspect.

The reference to insulation is intended to encompass any continuous insulation and cavity insulation in walls.

Having discussed this issue with testing labs it has become clear that NFPA 285 fire tests are conducted on the entire wall assembly (including framing and sheathing), wherefore, it is best to eliminate the term "exterior wall envelope", since the IBC definition is not consistent with the way the term is used in the field and there is disagreement over the meaning of the term. Therefore, the proposed changes below eliminate the term "exterior wall envelope" and replace it by either exterior wall or exterior wall assembly (or even exterior wall covering, if applicable). The exterior wall assembly is pretty much the same as the exterior wall, but, in view of the fact that the "exterior wall" is described in the code based on an exterior wall not being a fire wall and an exterior wall having a slope of 60 degrees or more, it is best to retain both terms. This proposal eliminates the term "exterior wall envelope" from the IBC, but references still exist in the IRC and IEBC (to be dealt with in Group B, if appropriate).

The exterior wall covering is the outer layer of the exterior wall assembly, which means it is a product, such as an MCM, an EIFS, an HPL or a siding, as shown in the definition.

The term building thermal envelope (currently described as "thermal envelope" in IBC Table1404.3(3) or "building envelope" in IBC definitions and IBC Section 110.3.8) should be related only to thermal protection. The term "building thermal envelope" should be used. It is defined in the IECC as: ***BUILDING THERMAL ENVELOPE.*** *The basement walls, exterior walls, floors, ceilings, roofs and any other building element assemblies that enclose conditioned space or provide a boundary between conditioned space and exempt or unconditioned space.*

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost impact because the changes are editorial in nature.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal is a good change by replacing "envelope" with "assembly" to be consistent with IECC. BUILDING THERMAL ENVELOPE is defined in the IECC as The basement walls, exterior walls, floors, ceilings, roofs, and any other building element assemblies enclose conditioned space or provide a boundary between conditioned space and exempt or unconditioned space. The proposal includes the unification of the terms and simplifies the language. (Vote: 13-0)

Final Hearing Results

FS120-21	AS

FS122-21

Original Proposal

IBC: 1402.5 (New), 1402.5.1 (New), 1402.5.2 (New), 1402.5.3 (New), 1402.5.4 (New), 1402.5.5 (New), 1402.5, [BS] 1402.6, [BS] 1402.7

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

1402.5 Vertical and lateral flame propagation. . Exterior walls on buildings of Type I, II, III and IV construction that are greater than 40 feet (12,192 mm) in height above grade plane and contain a combustible exterior wall covering, combustible insulation, or a combustible water-resistive barrier shall comply with Sections 1402.5.1 through 1402.5.5, as applicable. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through 1402.5.5, the exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1 Combustible Water resistive barrier. Exterior walls containing a combustible water-resistive barrier shall comply with Section 1402.6.

1402.5.2 Metal Composite Materials (MCM). . Exterior walls containing MCM systems shall comply with Section 1406.

1402.5.3 Exterior insulation and finish system (EIFS). . Exterior walls of any height above grade plane containing EIFS shall comply with Section 1407.

1402.5.4 High-pressure decorative exterior-grade compact laminate (HPL) system. . Exterior walls containing an HPL system shall comply with Section 1408.

1402.5.5 Foam Plastic Insulation. Exterior walls of any height above grade plane containing foam plastic insulation shall comply with Section 2603.5.

Revise as follows:

~~1402.5~~ 1402.6 **Water-resistive barriers.** *Exterior walls* on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. Walls in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has a wall covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. Walls in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   - 2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
   - 2.2 A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

[BS] ~~1402.6~~1402.7 Flood resistance. For buildings in *flood hazard areas* as established in Section 1612.3, *exterior walls* extending below the elevation required by Section 1612 shall be constructed with flood-damage-resistant materials.

[BS] ~~1402.7~~1402.8 Flood resistance for coastal high-hazard areas and coastal A zones. For buildings in *coastal high-hazard areas* and coastal A zones as established in Section 1612.3, electrical, mechanical and plumbing system components shall not be mounted on or penetrate through *exterior walls* that are designed to break away under *flood loads*.

Reason: This proposal assists users of the Code by providing reference to all the relevant sections of Chapter 14 and Chapter 26 containing specific requirements for exterior wall assemblies needing testing to NFPA 285. The existing Section 1402.5 (to become 1402.6) provides requirements for exterior walls with combustible water resistive barriers as the only combustible component but in the absence of a section before it indicating that exterior wall assemblies containing combustible materials must be tested to NFPA 285 and providing a road map to send the code user to the appropriate sections, some users may not be clear on the full applicability. In the IBC now:

Section 1406 provides comprehensive requirements for MCM systems, including use on exterior walls of Types I, II, III and IV construction

Section 1407 provides comprehensive requirements for EIFS systems that includes compliance with "…other applicable requirements of Chapters 7, 14, 16 and 26.," (Section 1407.1) and compliance with ASTM E2568 (Section 1407.2).

Section 1408 provides comprehensive requirements for HPL systems, including use on exterior walls of Types I, II, III and IV construction

Section 2603.5 provides comprehensive requirements for foam plastic insulation, including use on exterior walls of Types I, II, III and IV construction. In this case, exterior walls of any height must be tested to NFPA 285.

With regard to other sections in Chapters 14 and 26 dealing with materials used in exterior wall assemblies but not with the full assembly, the following applies. :

Sections 1403 contains specific requirements for some materials used for the construction of exterior walls

Section 1405.1 contains specific requirements for combustible exterior wall coverings

Sections 2606 through 2611 contain specific requirements for various types of light transmitting plastics· Other sections in Chapter 26 contain specific requirements for other plastic materials.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The changes in this proposal are a road map that clarify the intent of the code.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1402.5 Vertical and lateral flame propagation. .
Exterior walls on buildings of Type I, II, III and IV construction that ~~are greater than 40 feet (12,192 mm) in height above grade plane and~~ contain a combustible exterior wall covering, combustible insulation, or a combustible water-resistive barrier shall comply with Sections

1402.5.1 through 1402.5.5, as applicable. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through 1402.5.5, the exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1Combustible Water resistive barrier.
Exterior walls containing a combustible water-resistive barrier shall comply with Section 1402.6.

1402.5.2 Metal Composite Materials (MCM)..
Exterior walls containing MCM systems shall comply with Section 1406.

1402.5.3 Exterior insulation and finish system (EIFS)..
Exterior walls ~~of any height above grade plane~~ containing EIFS shall comply with Section 1407.

1402.5.4 High-pressure decorative exterior-grade compact laminate (HPL) system..
Exterior walls containing an HPL system shall comply with Section 1408.

1402.5.5 Foam Plastic Insulation.
Exterior walls ~~of any height above grade plane~~ containing foam plastic insulation shall comply with Section ~~2603.5~~ <u>2603</u>.

Committee Reason: The committee concluded the modification appropriately deletes "are greater than 40 feet (12,192 mm) in height above grade plane", consistent with the intent of the code. This proposal assists users of the Code by providing reference to all the relevant sections of Chapter 14 and Chapter 26 containing specific requirements for exterior wall assemblies needing testing to NFPA 285. (Vote: 11-2)

Final Hearing Results

FS122-21	AM

FS124-21

Original Proposal

IBC:202 (New), 1402.7 (New)

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com)

2021 International Building Code

Add new definition as follows:

ENGINEERING ANALYSIS. A report from an approved source or an approved agency providing an analysis of alternative building elements, components, assemblies, designs, constructions, or other identified attributes and comparing them to existing data or prescriptive designs for compliance of the alternative with identified provisions prescribed by the code or other identified standard.

Add new text as follows:

1402.7 Vertical and lateral flame propagation compliance methods. When exterior wall assemblies are required in this Chapter to be tested for vertical and lateral flame propagation in accordance with, and comply with the acceptance criteria of NFPA 285, compliance with the requirements shall be established by any of the following:

1. An exterior wall assembly tested in accordance with and meeting the acceptance criteria of NFPA 285.
2. An exterior wall assembly design listed by an approved agency for compliance with NFPA 285.
3. An engineering analysis based on NFPA 285 test data as allowed by Section 104.11.

Reason: The new proposal defines engineering analysis, a term that is widely used within the IBC. Terms used in the I-Codes include engineering evaluation, engineering assessment, engineering calculations, engineering judgement, engineering analysis, and rational analysis with “engineering analysis” used most often in the IBC. Engineering analyses are used to perform critical performance evaluation support the use of alternate materials and methods as allowed in Section 104.11.
The new section on compliance methods assists code enforcement by providing three compliance methods for those exterior wall assemblies that must be tested in accordance with NFPA 285. While the Code accepts the concept of approval-by-analysis under Section 104.11 this proposal provides specific guidance to credible sources of compliance information for required NFPA 285 testing

In the context of exterior wall assemblies of Type I – IV construction, analysis of deviations from an as-tested assembly are an acceptable means by which to support recognition of a modified assembly. All analysis or extension of results must be substantiated as being based on the fire exposure and acceptance criteria of NFPA 285. Upon submission of such documentation to the building official, the engineering analysis or engineering judgement can be approved as the basis for showing compliance with Section 2603.5.5 of the code.

Each compliance method is addressed below:

1. NFPA 285 test data, from an accredited laboratory, for the exterior wall assembly confirms specific performance of a specific assembly.

2. Designs listed by an accredited and approved agency will be based on successful NFP 285 testing of the exterior wall assembly and accompanying analysis of data.

3. Analysis of deviations in construction or material(s) from a successful NFPA 285 test using principles of fire science and fire protection engineering is an appropriate means to support recognition of an assembly where such analysis considers influences that deviation(s) will have on the performance of the tested assembly and determines the deviations will not significantly alter the full-scale results.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies methods available to designers, builders, and building officials that are acceptable to support verification and approval exterior wall assemblies regarding testing and compliance with the acceptance criteria of NFPA 285.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee concluded there are serious issues with the proposal and a lot of controversy with it. Section 104.11, Alternative materials, design, and methods of construction and equipment, could be used. The proposed definition of engineering analysis is not broad enough to apply to the use of the term currently in the code. The proposal could have been submitted as two different proposals for each item. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

~~**ENGINEERING ANALYSIS .** A report from an approved source or an approved agency providing an analysis of alternative building elements, components, assemblies, designs, constructions, or other identified attributes and comparing them to existing data or prescriptive designs for compliance of the alternative with identified provisions prescribed by the code or other identified standard.~~

1402.7 Vertical and lateral flame propagation compliance methods . When exterior wall assemblies are required in this Chapter to be tested for vertical and lateral flame propagation in accordance with, and comply with the acceptance criteria of NFPA 285, compliance with the requirements shall be established by any of the following:

1. An exterior wall assembly tested in accordance with and meeting the acceptance criteria of NFPA 285.
2. An exterior wall assembly design listed by an approved agency for compliance with NFPA 285.
3. ~~An engineering~~ An ~~engineering~~approved analysis based on ~~NFPA 285 test data as allowed by Section 104.11 104.11.~~an assembly or condition tested in accordance with and meeting the acceptance criteria of NFPA 285.

Commenter's Reason: This Public Comment is necessary to address concerns raised during opposition testimony and by committee statements supporting Disapproval. Our members believe that clarification of prescriptive compliance pathways regarding NFPA 285 provides clear and valuable guidance to all code users and for the enforcement of the Code. The three pathways described in the proposal are to the same as those prescribed and allowed for other large-scale assembly tests (often accompanied by Labeling) such as ASTM E119 / UL 263, and several other disciplines not related to fire testing or fire performance. Where this proposal differs is that it prescribes all three routes to compliance within a single section.

This Public Comment:

- Removes the Engineering Analysis term and proposed definition.
- Retains the [New] Section 1402.7, but with revisions to:
    - Remove “engineering” terminology
    - Remove reference to 104.11
    - Add clarifying language regarding the analysis is based on NFPA 285 data for a tested assembly / condition
    - Add language requiring approval of the analysis

Publications describing NFPA 285 and the use of NFPA 285 test data for analysis of assembly fire performance are included with this public comment.

We respectfully request Approval FS124-21 as Modified by this Public Comment. The modification is an improvement to the original proposal and addresses concerns expressed during the Committee Action Hearings.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Bibliography:

1. NFPA 285 - Extending Data with Comparative Engineering Analysis, IIBEC Interface, March 2021
2. NFPA 285 Engineering Judgements: A Practical Compliance Option, The Construction Specifier, June 2021

The link for the two articles: https://www.modernbuildingalliance.us/resources/

See labels: IIBEC Interface Article and Construction Specifier Article and use download resource button.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The proposal clarifies existing methods available to designers, builders, and building officials that are acceptable to support verification and approval exterior wall assemblies regarding testing and compliance with the acceptance criteria of NFPA 285.

Final Hearing Results

FS124-21	AMPC1

FS125-21

Original Proposal

IBC: 1402.8 (New)

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com); Robert A. Zabcik, Metal Construction Association (MCA), Metal Construction Association (MCA) (bob@ztech-consulting.com)

2021 International Building Code

Add new text as follows:

1402.8 Exterior wall veneers manufactured using combustible adhesives. Exterior wall assemblies on buildings of Type I, II, III or IV construction that are greater than 40 feet (12,192 mm) in height above grade plane and contain an exterior wall veneer manufactured using a combustible adhesive to laminate a metal core with noncombustible facing materials shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285, with the adhesive level at the maximum application rate intended for use. Combustibility shall be determined in accordance with Section 703.3.

Exception:

1. Walls in which the adhesive is the only combustible component and the adhesive complies with the following:
   1.1. A peak heat release rate of less than 150 kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18 MJ/kg when tested, in accordance with ASTM E1354, with the adhesive applied to a noncombustible substrate at the maximum application rate intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.

   1.2. A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723.

Reason: This proposed new section is specific to exterior wall veneers composed of a metal core and facings that areboth noncombustible materials, and the facings are laminated to the core using a combustible laminating adhesive. IBC Section 703.3.1 on noncombustible materials does not address the condition of combustible adhesives used to adhere a noncombustible surfacing (i.e. facings) to a noncombustible base (i.e. a metal core). The language of Section 703.3.1 has, in practice, been interpreted such that the scope of the exception includes veneer materials / products with a noncombustible core and thin facings (noncombustible or having limited surface burning characteristics), even though a combustible adhesive present.

Interpreting Section 703.3.1 in such manner has resulted in determinations that the veneer materials described above are considered noncombustible and, therefore, exterior wall coverings using these materials are not required to be tested in accordance with, or comply with the acceptance criteria of, NFPA 285 even though the veneer may contain a combustible material (the adhesive) of unknown and unregulated flammability. The IBC does not currently contain provisions regulating the flammability of combustible adhesives when used in exterior wall applications. The proposed change establishes a flame propagation requirement for this type of exterior veneer when used in exterior wall covering applications.

The proposal contains an exception to required NFPA 285 testing for the condition where the combustible adhesive is the only combustible component in the exterior wall assembly and the adhesive complies with specific flammability limitations and surface burning characteristics. The flammability limitations and surface burning characteristics prescribed in the proposed exception are equivalent to those currently recognized for the condition where a combustible water resistive barrier is the only combustible component in an exterior wall assembly.
The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas

Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Figure 1. Metal honeycomb core (facing removed on lower half) – Combustible adhesives used to attach both top and bottom facings.

Figure 2. Corrugated metal core panel (End View) - Combustible adhesives used to attach both top and bottom facings.

Cost Impact: The code change proposal will increase the cost of construction
By expanding required compliance with NFPA 285, the proposal will increase testing for a segment of this exterior wall covering putting them at a level that is consistent with other exterior wall coverings specifically identified in the IBC including Metal Composite Materials (MCM), Exterior Insulation and Finish Systems (EIFS), High-Pressure Laminates (HPL), etc.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee disapproval is based on the committee action on FS121-21. (Vote: 11-1)

Public Comments

Public Comment 1

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com); Robert A. Zabcik, Metal Construction Association (MCA), Metal Construction Association (MCA) (bob@ztech-consulting.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1402.8 Exterior wall veneers manufactured using combustible adhesives . Exterior wall assemblies on buildings of Type I, II, III or IV construction that are greater than 40 feet (12,192 mm) in height above grade plane and contain an exterior wall veneer manufactured using a combustible adhesive to laminate a metal core with noncombustible facing materials shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285, with the adhesive level at the maximum application rate intended for use. Combustibility shall be determined in accordance with Section 703.3.

~~**Exception:**~~

1. ~~Walls in which the adhesive is the only combustible component and the adhesive complies with the following~~:
   1.1. ~~A peak heat release rate of less than 150 kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18 MJ/kg when tested, in accordance with ASTM E1354, with the adhesive applied to a noncombustible substrate at the maximum application rate intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.~~

   1.2. ~~A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723.~~

Commenter's Reason: This proposal and public comment are necessary to address a loophole by which the use of certain exterior cladding materials containing a combustible adhesive in Type I-IV construction are not required to undergo NFPA 285 tests because they "…shall be acceptable as noncombustible…" under the Exception to Section 703.3.1. In effect, this loophole allows the unregulated use of a combustible adhesive in exterior wall veneers of Type I-IV construction. While the volume of this adhesive may be limited, it has been shown to lead to excessive flame propagation in exterior veneer uses. The proposal and this PC seek to add a prescriptive requirement for NFPA 285 testing when these materials are used in or on exterior walls of Type I-IV construction.
This Public Comment removes the proposed Exception that the committee found objectionable while retaining the prescribed requirement for NFPA 285 testing when these materials are used on exterior walls of Type I-IV construction.

The committee's reason for Disapproval was based on the Disapproval action taken on FS121-21 that sought to add an exception to NFPA 285 testing for exterior walls containing a combustible WRB and FRTW. This code proposal is actually the opposite of FS121-21 in that it seeks to add the NFPA 285 testing requirement for these metal-core with metal-faced laminated panel products using combustible adhesives.This loophole in the IBC allows exterior laminated panels to be exempt from the fire performance criteria of NFPA 285 when used on exterior walls of Type I-IV buildings greater than 40ft in height even though there is a known potential flame propagation. Metal-core panels with thin metal faces adhered using a combustible laminating adhesive have shown significant flame propagation in NFPA 285 testing, and several other large-scale tests around the world (also due to excessive vertical and lateral flame spread). These test results have led to significant limitations in the use of this product type on high-rise and even mid-rise buildings in both England and Australia.

Language contained in IBC Section 703.3.1 has been used to accept this type of material as noncombustible. This proposal does nothing to change 703.3.1 but adds a prescriptive requirement for metal core laminated panels to be tested in accordance with NFPA 285 when used as an exterior wall veneer on exterior walls for buildings taller than 40ft in height as is required for all other combustible materials (i.e., combustible WRBs, MCM, HPL, EIFS, foam plastic insulation, etc.).

In the initial proposal, the intent of the exception was to limit the amount of combustible material; as is currently allowed for walls containing only a combustible WRB. This exception has been eliminated because:

- No cone calorimeter data exists to provide a benchmark on the adhesive performance with respect to the exception criteria.
- It would be rare, if not impossible for this type of panel to be installed without the use of a WRB, so a combustible limitation based on the adhesive being the only combustible material in the exterior wall assembly is not realistic and the exceptions of Section 1402.5 would not apply; thus NFPA 285 testing would be required.

At the hearings in April, there was no opposition to this proposal. This proposal actually adds a requirement for NFPA 285 testing of what is technically a combustible cladding element; which is currently being installed as noncombustible due to the loophole in the IBC. A final comment from the committee was a reference to Grenfell Tower and that “we need to get this issue addressed correctly." That is exactly what this proposal is designed to do. Take what has been shown to be a combustible cladding material with vertical and lateral flame spread issues and require testing to NFPA 285.

We respectfully request Approval as Modified by this Public Comment.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
By expanding required compliance with NFPA 285, the proposal will increase testing for a segment of this exterior wall covering putting them at a level that is consistent with other exterior wall coverings specifically identified in the IBC including Metal Composite Materials (MCM), Exterior Insulation and Finish Systems (EIFS), High-Pressure Laminates (HPL), etc.

Final Hearing Results

FS125-21	AMPC1

FS126-21

Original Proposal

IBC: 1403.2

Proponents: Rob Brooks, Rob Brooks and Associates LLC, DuPont Performance Building Solutions (rob@rtbrooks.com)

2021 International Building Code

Revise as follows:

1403.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. The *water-resistive barrier* material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2.
Water-resistive barriers shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. ASTM E331 in accordance with Section 1402.2.
4. Other approved materials installed in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Reason: The purpose of this proposal is to coordinate IBC Section 1403.2 with IRC Section R703.2.
Two provisions from the water-resistive barrier Section R703.2 of the IRC are copied. The first provision is located in the charging language of 1403.2, which requires that the water-resistive barrier shall be continuous to the top of walls and terminated at penetrations. The second provision is located after the list of approved materials and requires that No. 15 felt and ASTM E2556 material installation use a horizontal orientation with specified lap lengths for the horizontal layers and vertical joints.

This proposal strengthens the IBC by ensuring the water-resistive barrier is continuous and will provide a means for draining water that enters the assembly to the exterior.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These products are typically installed in accordance with the proposed amendments and will not increase the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1403.2Water-resistive barrier.
Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. The intersection between the *water-resistive barrier* materials and fenestration openings shall be flashed and assembled inaccordance with the fenestration manufacturer's installation instructions, or other *approved* methods for applications not addressed by the fenestration manufacturer's instructions. The *water-resistive barrier* material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2.*Water-resistive barriers* shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. ASTM E331 in accordance with Section 1402.2.
4. Other approved materials installed in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Committee Reason: The committee concluded that the modification corrects complex language. The proposal coordinates IBC Section 1403.2 with IRC Section R703.2. The proposal appropriately includes prescriptive instructions for No.15 asphalt felt. (Vote: 13-0)

Final Hearing Results

FS126-21	AM

FS128-21

Original Proposal

IBC: 1403.2

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1403.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. *Water-resistive barriers* shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. <u>Foam plastic insulating sheathing *water-resistive barrier* systems complying with Section 1402.2 and installed in accordance with manufacturer's installation instructions.</u>
4. ~~3.~~ ASTM E331 in accordance with Section 1402.2.
5. ~~4.~~ Other approved materials installed in accordance with the manufacturer's installation instructions.

Reason: Foam sheathing has been used successfully for many years as an approved WRB system when qualified for this application and installed in accordance with manufacturer installation instructions. It is appropriate to recognize this WRB method in the code because it has consistently demonstrated at least equivalent performance of other materials prescriptively recognized in this list (e.g., No.15 felts, Grade D papers, and wraps per ASTM E2556). Section 1402.2 is referenced because those performance criteria have been historically applied as the water-resistance requirements of foam sheathing WRB systems -- tested in an exposed condition on full-scale wall assemblies for qualification purposes. Installation in accordance with manufacturer's instructions also is required because those instructions address the use of qualified components, such as joint treatments (e.g., tapes) and installation procedures consistent with tested performance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal has no cost impact because it simply adds a WRB option to the code. The performance and installation requirements are consistent with current successful use.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement. (12-0)

Final Hearing Results

FS128-21	AS

FS130-21

Original Proposal

IBC: 1403.8
Proponents: Marcelo Hirschler, GBH International, self (mmh@gbhint.com)

2021 International Building Code

Delete without substitution:

~~**1403.8 Plastics.** Plastic panel, apron or spandrel walls as defined in this code shall not be limited in thickness, provided that such plastics and their assemblies conform to the requirements of Chapter 26 and are constructed of *approved* weather-resistant materials of adequate strength to resist the wind *loads* for cladding specified in Chapter 16~~.

Reason: 1. This section is misleading because it gives the impression that it handles***all of the*** plastic products used in exterior walls when, in reality it deals with a few isolated products with no major applicability and does not deal with the plastic products actually used in exterior walls.
~~2.~~ Moreover, this section is not necessary to tell the user of the code that Chapter 16 deals with structural design and section 1609 deals with wind loads (see table of contents). It is also not necessary to point out that chapter 26 deals with plastics (it is already shown in the table of contents) and that sections 2606 through 2611 deal with various light transmitting plastics issues (also shown in the table of contents). Vague references to other chapters are not normally contained in the code. For example, there is no reference in Chapter 14 to Chapter 23 for wood products.

~~3.~~ Finally, the information in this section about terms defined in the code is incorrect. This section states that the terms used in the section are "defined in this code", but that is incorrect, as shown below.

The term spandrel is not defined in the IBC (and neither is the term plastic spandrel wall or spandrel wall). In fact, the term spandrel is used in the following locations, and nowhere does that apply to plastic spandrels or to plastic materials used to the construction of exterior walls.

1. As one of the structural elements for primary structural frames, in the definition of “primary structural frame”.
2. As part of the elements separating openings in 705.8.5 (Vertical separation of openings).
3. In 715.4, Exterior curtain wall/floor intersection, as something requiring fire resistance ratings.
4. In 715.5 Spandrel wall, describing fire resistance requirements.
5. In 2403. 1 Identification of tempered spandrel glass
6. In 2406.3, dealing with tempered spandrel glass

The term plastic panel is also not defined in the IBC, but it clearly is associated with plastic light transmitting panels, which are covered in chapters 24 and 26. It is not used in any context other than light transmitting panels. This section does not point to chapter 24 and there is no need to point to chapter 26.The term plastic apron is not used anywhere in the IBC. The term apron is used in item 9 of 603.1.2, referring to windows, and in appendix F on rodentproofing. These sections are not relevant to plastic aprons on exterior walls.

Therefore, the section is unnecessary and misleading.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply eliminates a section that refers to products that do not exist.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal is a good deletion of section 1403.8, Plastics. The pointers to chapter 26 and chapter 16 are not needed. (Vote: 13-0)

Final Hearing Results

FS130-21	AS

FS133-21

Original Proposal

IBC: SECTION 1403, 1403.15 (New), SECTION 1404, TABLE 1404.2, 1404.19 (New), 1404.19.1 (New)

Proponents: Michael Gardner, M Gardner Services, LLC, National Gypsum Company (michael@mgardnerservices.com)

2021 International Building Code

SECTION 1403
MATERIALS

Add new text as follows:

1403.15 Fiber-mat reinforced cementitious backer units. Fiber-mat reinforced cementitious backer units used as an exterior substrate for the application of exterior finish materials shall comply with ASTM C1325.

SECTION 1404
INSTALLATION OF WALL COVERINGS

TABLE 1404.2 MINIMUM THICKNESS OF WEATHER COVERINGS

Portions of table not shown remain unchanged.

COVERING TYPE	MINIMUM THICKNESS (inches)
Fiber-mat reinforced cementitious backer units	0.5

Add new text as follows:

1404.19 Fiber-mat reinforced cementitious backer units. Fiber-mat reinforced cementitious backer units shall be permitted on exterior walls.

1404.19.1 Installation. Installation of fiber-mat reinforced cementitious backer units used as an exterior substrate for the application of exterior finish materials shall be in accordance with backer unit manufacturer's installation instructions. Panels shall be installed using corrosion-resistant fasteners. Finish materials shall be installed in accordance with approved finish material manufacturer's instructions.

Reason: ASTM C1325 cement boards (technically, fiber-mat reinforced cementitious backer units) were first incorporated into the IBC in 2006 when they were added to Section 2509 as a substrate for interior wall tile in shower and tub areas. In the interim period, cement board has gained use as an exterior substrate, most often for architectural stone or direct-applied finish system applications.
Exterior use of cement board is permitted by the C1325 standard and the two applicable Acceptance Criteria for cement board: AC 376, which addresses the cement board itself, and AC 59, which addresses direct-applied finish systems. But because the only IBC reference to the material is the interior use described in Chapter 25, confusion occurs regarding the ability to use cement board as an exterior substrate. This proposal is intended to clarify that cement board conforming with the ASTM C1325 standard can be used as a substrate in exterior applications by adding the existing reference contained in Chapter 25 to Chapter 14.

Note that, unlike Chapter 25, this proposal does not use the term “nonasbestos” when making reference to cement board. In 2018, the ASTM C17 committee voted to remove the term nonasbestos from the title of the C1325 standard. Removing the term corrected the erroneous perception that an asbestos-based cement backer unit existed in the marketplace. The first edition of the standard with the term nonasbestos removed from the title was issued with a 2018 date. The 2018 edition of the C1325 standard is referenced in Chapter 35. Unfortunately, the listing of the C1325 standard in Chapter 35 is in error because it displays an outdated standard title that contains the term “nonasbestos”. In addition, the related language in Chapter 25 was not updated to coincide with the change to the title of the standard. In submitting this proposal, it is requested that ICC staff address and correct the noted document title as errata. The proponent intends to submit a proposal to remove the term from Chapter 25 during the B group cycle.

To be clear, the scope of the ASTM C1325 standard clearly covers only cement backer units that do not contain asbestos. Materials manufactured to the C1325 standard do not contain asbestos.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the proposal is to clarify that the material in question can be used in an exterior application.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal adds needed language for Fiber-mat reinforced cementitious backer units. (Vote: 12-0)

Final Hearing Results

FS133-21	AS

FS134-21

Original Proposal

IBC: SECTION 202 (New), 1403.15 (New), ASTM Chapter 35 (New)

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Building Code

Add new definition as follows:

INSULATED VINYL SIDING

.
A continuous insulation cladding product, with manufacturer-installed foam plastic insulating material as an integral part of the cladding product, having a thermal resistance not less than R-2.

Add new text as follows:

1403.15 Insulated Vinyl Siding. Insulated vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D7793 by an approved agency.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM D7793-20 Standard Specification for Insulated Vinyl Siding

Reason: This product category has been in the market place for about 25 years. It was standardized almost 10 years ago. The product category has been recognized in both the IRC and IECC since 2015.
The IBC Fire Safety Committee and other fire safety experts asked that the product category be tested to the ASTM E84 test as an assembly (both vinyl and foam together) in order to be recognized in the IBC. That test (max flame-spread 200) has now been added to the standard, ASTM D7793-20.

The proposed definition is slightly different than the definition in the IRC. It is important to clearly identify this cladding as a form of continous insulation as well, since it is tested for R-value, and must have an R-2 to qualify in the ASTM standard, and is in line with the energy code.

This product category offers both an affordable cladding and form of continuous insulation, adding an excellent sustainable energy efficient option for product specifiers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of this standard, simply offers another cladding option which in some cases could help to reduce the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Although the committee had minor concerns with some of the testing requirements, they agreed that ASTM D7793 was appropriate. The material would need to be tested based on the foam plastic requirements in chapter 26 based on current code text. (Vote: 8-3)

Final Hearing Results

FS134-21	AS

FS135-21

Original Proposal

IBC: 1404.3, 1404.3.3 (New)

Proponents: Theresa Weston, The Holt Weston Consultancy, LLC, The Holt Weston Consultancy, LLC (holtweston88@gmail.com)

2021 International Building Code

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. <u>Vapor retarders shall be installed in accordance with 1404.3.3</u>The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.
Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.

Add new text as follows:

<u>**1404.3.3 Vapor Retarder Installation.** Vapor retarders shall be installed in accordance with the manufacturer's instructions or an approved design. Where a vapor retarder also functions as an air barrier, the vapor retarder shall be installed as a continuous air barrier in accordance with the International Energy Conservation Code.</u>

Reason: In addition to protection from condensation, vapor retarders may be used as part of an air barrier assembly. This proposal seeks to coordinate the installation of vapor retarders between the IBC and IECC in order to streamline the compliance with both codes.
Vapor retarders are commonly installed as or in conjunction with an air barrier. Air leakage control is currently dealt with in the I-codes based on energy efficiency considerations, but it is also critical to protection against moisture condensation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will neither increase nor decrease the cost of construction, as its intention is to ensure that an existing requirement is installed in an effective manner that is coordinated with the use of these materials and assemblies in the IECC.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1404.3.3Vapor Retarder Installation.
Vapor retarders shall be installed in accordance with the manufacturer's instructions or an approved design. Where a vapor retarder also

functions as ~~an~~ a component of a continuous air barrier, the vapor retarder shall be installed as ~~a continuous~~ an air barrier in accordance with the International Energy Conservation Code.

Committee Reason: The committee determined that the modification solves the issue of misinterpreting the section. The proposal coordinates the installation of vapor retarders between the IBC and IECC. (Vote: 13-0)

Final Hearing Results

FS135-21	AM

FS136-21

Original Proposal

IBC: 1404.3, TABLE 1404.3(4)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

Where a Class I or II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class I or II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.

TABLE 1404.3(4) CONTINUOUS INSULATION WITH CLASS I OR II VAPOR RETARDER

Portions of table not shown remain unchanged.

Reason: In the prior code cycle, recognition of Class I and II "responsive" (smart) vapor retarders was added to the code (see Exception #4 in Section 1404.3). At that time, it was not possible to coordinate that change with the proposal which added guidance for use of a Class II vapor retarder (which also was required to be responsive, such as a Kraft paper facer on batt insulation) with exterior continuous insulation, particularly foam sheathing. A Class I responsive vapor retarder will provide improved performance over the currently recognized Class II responsive vapor retarder and should be permitted as addressed in this coordinating proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal does not impact cost because it is adding an option. However, there may be cases where use of this option could reduce cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the addition of class I is appropriate. (Vote: 13-0)

Final Hearing Results

FS136-21	AS

FS137-21

Original Proposal

IBC: SECTION 202 (New), 1404.3, TABLE 1404.3(4)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Add new definition as follows:

RESPONSIVE VAPOR RETARDER

.

A vapor retarder material complying with a *vapor retarder class* of Class I or II, but which also has a vapor permeance of 1 perm or greater in accordance with ASTM E96, water method (Procedure B).

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.
Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall be a *responsive vapor retarder* ~~have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B~~.)Use of a Class I interior vapor retarder, that is not a *responsive vapor retarder*, in frame walls with a Class I vapor retarder, that is not a *responsive vapor retarder*, on the exterior side shall require an *approved* design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A *responsive vapor retarder* ~~Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B)~~ shall be allowed on the interior side of any frame wall in all climate zones.

TABLE 1404.3(4) CONTINUOUS INSULATION WITH CLASS II RESPONSIVE VAPOR RETARDER

Portions of table not shown remain unchanged.

Reason: This proposal adds a definition for responsive vapor retarders (also known as "smart" vapor retarders). The concept and application of responsive vapor retarders was appropriately added in the 2021 IBC last code cycle. However, in each use the properties had to be described because a definition did not exist. This proposal provides a consistent definition and applies it in relevant portions of the code for more efficient text and clarity.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds a definition to clarify and make the code text more efficient.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1404.3Vapor retarders.

Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall be a *responsive vapor retarder* . Use of a Class I interior vapor retarder, that is not a *responsive vapor retarder*, in frame walls with a Class I vapor retarder~~, that is not a *responsive vapor retarder*,~~ on the exterior side shall require an *approved* design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A *responsive vapor retarder* shall be allowed on the interior side of any frame wall in all climate zones.

Committee Reason: The committee concluded the modification clarifies the text by deleting" that is not a responsive vapor retarder". The proposal encapsulates performance and the definition that is already being recognized. (Vote:13 -0)

Final Hearing Results	
FS137-21	AM

FS138-21

Original Proposal

IBC: SECTION 202 (New), 1404.3, TABLE 1404.3(1), TABLE 1404.3(2), TABLE 1404.3(3), TABLE 1404.3(4), 1404.3.1, TABLE 1404.3(5) (New), 1404.3.2

Proponents: Rob Brooks, Rob Brooks and Associates LLC, DuPont Performance Building Solutions (rob@rtbrooks.com); Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Add new definition as follows:

RESPONSIVE VAPOR RETARDER

.

A vapor retarder material complying with a *vapor retarder class* of Class I or II, but which also has a vapor permeance of 1 perm or greater in accordance with ASTM E96, water method (Procedure B).

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Table~~s~~ 1404.3(2) ~~and 1404.3(3)~~ , or an *approved* design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

~~Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.~~

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A vapor retarder shall not be required in Climate Zones 1, 2, and 3.~~Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.~~
5. In Climate Zones 4 through 8, a vapor retarder on the interior side of frame walls shall not be required where the assembly complies with Table 1404.3(5)

TABLE 1404.3(1) VAPOR RETARDER MATERIALS AND CLASSES

VAPOR RETARDER CLASS	ACCEPTABLE MATERIALS
I	Sheet polyethylene, nonperforated aluminum foil, or other approved materials with a perm rating of less than or equal to 0.1
II	Kraft-faced fiberglass batts or vapor retarder paint or other approved materials, applied in accordance with the manufacturer’s instructions for a perm rating greater than 0.1 and less than or equal to 1.0
III	Latex paint, enamel paint, or other approved materials, applied in accordance with the manufacturer’s instructions for a perm rating of greater than 1.0 and less than or equal to 10

Revise as follows:

TABLE 1404.3(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	I[a]	II[a]	III[a]
1, 2	Not permitted	Not Permitted	Permitted
3	Not permitted	Permitted[c]	Permitted
4 (except Marine)	Not permitted	Permitted[c]	See Table 1404.3(3)
Marine 4, 5, 6, 7, 8	Permitted[b,c]	Permitted[c]	See Table 1404.3(3)

a. ~~See also Section 1404.3.2~~. A *responsive vapor retarder* shall be allowed on the interior side of any frame wall in all climate zones.

b. Use of a Class I interior vapor retarder, that is not a responsive vapor retarder, in frame walls with a Class I vapor retarder, that is not a *responsive vapor retarder*, on the exterior side shall require an*approved* design.

c. Where a Class I or II vapor retarder is used in combination with foam plastic insulating sheathing installed as*continuous insulation* on the exterior side of frame walls, the *continuous insulation* shall comply with Table 1404.3(4) and the Class I or II vapor retarder shall be a *responsive vapor retarder*.

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum *Continuous insulation* with *R*-value ≥ R2.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum *Continuous insulation* with *R*-value ≥ R5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R7.5 over 2 × 6 wall
6	Vented cladding over fiberboard Vented cladding over gypsum *Continuous insulation* with *R*-value ≥ R7.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R11.25 over 2 × 6 wall
7	*Continuous insulation* with *R*-value ≥ R10 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R15 over 2 × 6 wall
8	*Continuous insulation* with *R*-value ≥ R12.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R20 over 2 × 6 wall

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, and other *approved* vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code.*

TABLE 1404.3(4) CONTINUOUS INSULATION WITH A CLASS I OR II RESPONSIVE VAPOR RETARDER

CLIMATE ZONE	PERMITTED CONDITIONS[a]
3	*Continuous insulation* with *R*-value ≥ R2
4, 5, 6	*Continuous insulation* with *R*-value ≥ R3 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R5 over 2 × 6 wall
7	*Continuous insulation* with *R*-value ≥ R5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R7.5 over 2 × 6 wall

8	*Continuous insulation* with *R*-value ≥ R7.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R10 over 2 × 6 wall

a. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class I or I*responsive vapor retarders*. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*. ~~In addition to the vapor retarder, spray foam with a maximum permeance of 1.5 perms at the installed thickness, applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to comply with the continuous insulation requirement only for the moisture control purposes of this table where the spray foam *R*-value plus any continuous insulation *R*-value provided equals or exceeds the specified continuous insulation *R*-value.~~

1404.3.1 Spray foam plastic insulation for moisture control with Class II and III vapor retarders. For purposes of compliance with Tables 1404.3(3) and 1404.3(4), spray foam with a maximum permeance of 1.5 perms at the installed thickness applied to the interior ~~cavity~~ side of wood structural panels, fiberboard, *insulating sheathing* or gypsum shall be deemed to meet the *continuous insulation* moisture control requirement in accordance with one of the following conditions:

1. ~~where the~~ The spray foam R-value meets or exceeds the specified continuous insulation R-value.
2. The combined R-value of the spray foam and *continuous insulation* is equal to or greater than the specified *continuous insulation* R-value.

Add new text as follows:

TABLE 1404.3(5) CONTINUOUS INSULATION ON WALLS WITHOUT A CLASS I, II, or III INTERIOR VAPOR RETARDER[a]

CLIMATE ZONE	PERMITTED CONDIITIONS[b,c]
4	*Continuous insulation* with R-value >= 4.5
5	*Continuous insulation* with R-value >= 6.5
6	*Continuous insulation* with R-value >= 8.5
7	*Continuous insulation* with R-value >= 11.5
8	*Continuous insulation* with R-value >= 14

a. The total insulating value of materials to the interior side of the exterior *continuous insulation*, including any cavity insulation, shall not exceed R-5. Where the R-value of materials to the interior side of the exterior *continuous insulation* exceeds R-5, an approved design shall be required.

b. A water vapor control material layer having a permeance of not greater than 1 perm in accordance with ASTM E96, Procedure A (dry cup) shall be placed on the exterior side of the wall and to the interior side of the exterior *continuous insulation*. The exterior *continuous insulation* shall be permitted to serve as the vapor control layer where , at its installed thickness or with a facer on its interior face, the exterior continuous insulation is a Class I or II vapor retarder.

c. The requirements of this table apply only to *continuous insulation* used to control moisture in order to allow walls without a Class I, II or III interior vapor retarder. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*.

-

Delete without substitution:

~~**1404.3.2 Hybrid insulation for moisture control with Class III vapor retarders.** For the purposes of compliance with Table 1404.3(3), the combined *R*-values of spray foam plastic insulation and continuous insulation shall be permitted to be counted toward the continuous *R*-value requirement.~~

Reason: This proposal is an "omnibus" proposal that incorporates the sum effect of multiple individual proposals separately submitted by

the Foam Sheathing Committee of the American Chemistry Council. This omnibus proposal provides a complete view of how all of the individual proposals are integrated (correlated) to avoid any confusion in how the various proposals may relate to the overall vapor retarder provisions. Thus, portions of Section 1404.3 are included even where changes are not made for a complete picture of the final provisions if all the individual proposals and/or this omnibus proposal is approved.
The individual proposals are segregated as follows:

Non-technical revisions to the 2024 IBC that correlate with the 2021 IRC:

a. Proposal 6811 - Relocate text from 1404.3 into Table 1404.3(2) where it is properly assigned to various climate zones.

Technical revisions to the 2024 IBC that correlate with the 2021 IRC:

a. Proposal 6782 - A proposal to not require a vapor retarder in Climate Zones 1, 2 and 3.

b. Proposal 6791 - Combine 1404.3.1 and 1404.3.2 and relocate table footnote to clarify combined use of spray foam and continuous insulation.

c. Proposal 6833 - Revise Table 1404.3(1) footnote to correlate with IRC.

Non-technical revisions that are new to the 2024 IBC that are not contained in the 2021 IRC:

a. Proposal 6789 - Define responsive vapor retarder and insert/replace text where appropriate.

Technical revisions that are new to the 2024 IBC that are not contained in the 2021 IRC:

a. Proposal 6784 - A new table and provisions for walls without a Class I, II or III interior vapor retarder

b. Proposal 6790 - Allow a Class I responsive vapor retarder with foam sheathing

This omnibus proposal is needed to better coordinate the 2024 IBC provisions with the 2021 IRC provisions, address unintended correlation issues that occurred between various 2021 IBC approved proposals the last code cycle, and to make a few incremental improvements to the 2024 IBC vapor retarder provisions that will also be proposed for the upcoming Group B hearings for the 2024 IRC.

Cost Impact: The code change proposal will decrease the cost of construction
This overall proposal of multiple separate proposals has the net effect of decreasing cost. For most aspects, this proposal will not increase or decrease cost because it is simply adding options (as explained in the various individual proposals incorporated into this omnibus proposal). However, in a few cases, such as the addition of the exception to not require a vapor retarder in Climate Zones 1-3 can reduce cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Table 1404.3(2)
<u>and Tables 1404.3(3) or 1404.3(4) as applicable</u>, or an *approved* design using accepted engineering practice for hygrothermal analysis. <u>Vapor retarders shall be installed in accordance with 1404.3.3.</u>The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A vapor retarder shall not be required in Climate Zones 1, 2, and 3.

5. In Climate Zones 4 through 8, a vapor retarder on the interior side of frame walls shall not be required where the assembly complies with Table 1404.3(5)

TABLE 1404.3(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	I[a]	II[a]	III
1, 2	Not permitted	Not Permitted	Permitted
3	Not permitted	Permitted[c]	Permitted
4 (except Marine)	Not permitted	Permitted[c]	See Table 1404.3(3)
Marine 4, 5, 6, 7, 8	Permitted[b,c]	Permitted[c]	See Table 1404.3(3)

a. . A *responsive vapor retarder* shall be allowed on the interior side of any frame wall in all climate zones.

b. Use of a Class I interior vapor retarder, that is not a responsive vapor retarder, in frame walls with a Class I vapor retarde~~, rthat is not a *responsive vapor retarder*,~~ on the exterior side shall require an *approved* design.

c. Where a Class I or II vapor retarder is used in combination with foam plastic insulating sheathing installed as*continuous insulation* on the exterior side of frame walls, the*continuous insulation* shall comply with Table 1404.3(4) and the Class I or II vapor retarder shall be a *responsive vapor retarder*.

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum *Continuous insulation* with *R*-value ≥ R2.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum *Continuous insulation* with *R*-value ≥ R5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R7.5 over 2 × 6 wall
6	Vented cladding over fiberboard Vented cladding over gypsum *Continuous insulation* with *R*-value ≥ R7.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R11.25 over 2 × 6 wall
7	*Continuous insulation* with *R*-value ≥ R10 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R15 over 2 × 6 wall
8	*Continuous insulation* with *R*-value ≥ R12.5 over 2 × 4 wall *Continuous insulation* with *R*-value ≥ R20 over 2 × 6 wall

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code,

<u>rainscreen systems,</u>
and other *approved* vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code.*

<u>**1404.3.3Vapor Retarder Installation**</u>**.** <u>Vapor retarders shall be installed in accordance with the manufacturer's instructions or an approved design. Where a vapor retarder also functions as a component of a continuous air barrier, the vapor retarder shall be installed as an air barrier in accordance with the International Energy Conservation Code.</u>

Committee Reason: The committee determined this proposal, with all the modifications, is a correlation of , FS135-21, FS136-21, FS137-

21, FS139-21, FS140-21, FS141-21, FS142-21, FS143-21 and FS144-21, which have already been approved by the committee on section 1404.3. The definition from FS 144-21 for rainscreen system still needs to be incorporated in the final 2024 IBC. (Vote: 13-0)

Final Hearing Results

FS138-21	AM

FS139-21

Original Proposal

IBC: 1404.3, TABLE 1404.3(2)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

~~Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.~~

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. ~~Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.~~

TABLE 1404.3(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	I[a]	II[a]	III[a]
1, 2	Not permitted	Not Permitted	Permitted
3	Not permitted	Permitted[c]	Permitted
4 (except Marine)	Not permitted	Permitted[c]	See Table 1404.3(3)
Marine 4, 5, 6, 7, 8	Permitted[b]	Permitted[c]	See Table 1404.3(3)

a. ~~See also Section 1404.3.2.~~ <u>Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.</u>

b. <u>Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an *approved* design.</u>

c. <u>Where a Class II vapor retarder is used in combination with foam plastic *insulating sheathing* installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B).</u>

Reason: This proposal moves text and an exception added last code cycle into footnotes for Table 1404.3(2), also added last code cycle. This makes the IBC formatting consistent with the IRC and is a matter of appropriately correlating individual proposals from the last code development cycle. It also properly associates the moved provisions with specific application conditions in Table 1404.3(2) as intended. This proposal also makes it clearer that the general Exceptions listed in Section 1404.3 do not apply to these specific requirements but to the overall general charging language in the first paragraph of Section 1404.3. This also is consistent with the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal addresses a correlation matter and code formatting clarification without changing technical requirements. Therefore, there is is no cost impact.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1404.3Vapor retarders.
Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Table
~~s~~ 1404.3(2) and Tables 1404.3(3) or 1404.3(4) as applicable, or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the

International Energy Conservation Code.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.

Committee Reason: The committee agreed with the modification adding Table 1404.3(4). The committee based their approval on the fact that the proposal appropriately moves text and an exception added last code cycle into footnotes for Table 1404.3(2). The proposal addresses correlation without changing technical contents. (Vote: 13 to 0)

Final Hearing Results

FS139-21	AM

FS140-21

Original Proposal

IBC: 1404.3

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.
5. <u>A vapor retarder shall not be required in Climate Zones 1, 2, and 3</u>.

Reason: This proposal correlates the IBC vapor retarder provisions with current IRC provisions by including an exception added to the IRC in the 2019 Group B hearing cycle. Similar changes to the vapor retarder provisions of the IBC had already been approved in the 2018 Group A hearing cycle, so it was not possible to correlate proposals on this matter (as intended) at that time. The exception is appropriate for walls constructed in accordance with the IRC and IBC.

Cost Impact: The code change proposal will decrease the cost of construction

The proposal removes the requirement to include an additional material or "control layer" in wall assemblies in Climate Zones 1-3. Thus, where the exception is applicable and used, it can lower the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal solves the issue of inward movement of moisture in Climate Zones 1, 2, and 3 by providing an exception. (Vote: 13-0)

Final Hearing Results

FS141-21

Original Proposal

IBC: 1404.3, TABLE 1404.3(5) (New)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.
5. In Climate Zones 4 through 8, a vapor retarder on the interior side of frame walls shall not be required where the assembly complies with Table 1404.3(5).

Add new text as follows:

TABLE 1404.3(5) CONTINUOUS INSULATION ON WALLS WITHOUT A CLASS I, II, or III INTERIOR VAPOR RETARDER[a]

CLIMATE ZONE	PERMITTED CONDITIONS[b,c]
4	Continuous insulation with R-value >= 4.5
5	Continuous insulation with R-value >= 6.5
6	Continuous insulation with R-value >= 8.5
7	Continuous insulation with R-value >= 11.5
8	Continuous insulation with R-value >= 14

a. The total insulating value of materials to the interior side of the exterior continuous insulation, including any cavity insulation, shall not exceed R-5. Where the R-value of materials to the interior side of the exterior continuous insulation exceeds R-5, an *approved* design shall be required.

b. A water vapor control material layer having a permeance of not greater than 1 perm in accordance with ASTM E96, Procedure A (dry cup) shall be placed on the exterior side of the wall and to the interior side of the exterior continuous insulation. The exterior continuous insulation shall be permitted to serve as the vapor control layer where, at its installed thickness or with a facer on its interior face, the exterior continuous insulation is a Class I or II vapor retarder.

c. The requirements of this table apply only to continuous insulation used to control moisture in order to allow walls without a Class I, II or III interior vapor retarder. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*.

Reason: This proposal is needed to coordinate with the IECC R-value options for wood-frame and cold-formed steel-frame walls to achieve compliance using exterior continuous insulation only without cavity insulation. This approach is consistent with the long-standing successful use of "insulation entirely above the roof deck" for low-slope roof systems (the same principle applies to walls). Consequently, this wall insulation option needs to be supported with a coordinated approach in the building code's water vapor control provisions to ensure performance at least equivalent to other wall assembly conditions addressed in Section 1404.3 (e.g., Tables 1404.3(3) and 1404.3(4)).
It is well known that placing the majority of insulation continuously on the exterior side of an assembly can provide a high degree of thermal and moisture control and protection of the structure. It also does not require an interior vapor retarder and, therefore, maximizes inward drying potential. For these reasons and others, it is commonly known as the "perfect wall". It is a practice currently and successfully used, yet it needs building code requirements to ensure appropriate use, compliance and enforcement.

As with any practice, there are limitations and requirements to prevent unintended misapplication. These are addressed in footnotes to the table in a manner consistent with other tables in Section 1404.3. The overall requirements of this proposal are based on an extensive review of water vapor control codes, standards, research data, field data, and practices (refer to ABTG, 2015 and ASTM, 2017 in the bibliography). This same research was used to justify major improvements to the vapor retarder provisions for the 2021 editions of the IBC and IRC during the 2018 and 2019 code development cycles. However, this "perfect wall" option was not addressed at that time.

Bibliography: ABTG (2015). Assessment of Water Vapor Control Methods for Modern Insulated Light-Frame Wall Assemblies, ABTG Research Report No. 1410-03, http://www.appliedbuildingtech.com/rr/1410-03
Crandell, J.H., "Assessment of Hygrothermal Performance and Design Guidance for Modern Light-Frame Wall Assemblies," Advances in Hygrothermal Performance of Building Envelopes: Materials, Systems and Simulations, ASTM STP1599, P. Mukhopadhyaya and D. Fisler, Eds., ASTM International, West Conshohocken, PA, 2017, pp. 362-394, http://dx.doi.org/10.1520/STP159920160097

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an option for vapor control, not a requirement. Thus, it does not impact cost of construction and, in some cases, may provide a solution that is more cost-effective for a particular building wall application.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal provides another wall insulation option for the code users. (Vote: 13-0)

Final Hearing Results

FS141-21	AS

FS142-21

Original Proposal

IBC: TABLE 1404.3(4), 1404.3.1, 1404.3.2

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1404.3(4) CONTINUOUS INSULATION WITH CLASS II VAPOR RETARDER

Portions of table not shown remain unchanged.

CLIMATE ZONE	PERMITTED CONDITIONS~~[a]~~

~~a. In addition to the vapor retarder, spray foam with a maximum permeance of 1.5 perms at the installed thickness, applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to comply with the continuous insulation requirement only for the moisture control purposes of this table where the spray foam *R*-value plus any continuous insulation *R*-value provided equals or exceeds the specified continuous insulation *R*-value.~~

1404.3.1 Spray foam plastic insulation for moi~~o~~sture control with Class II and III vapor retarders. For purposes of compliance with ~~Table~~ Tables 1404.3(3) and 1404.3(4), spray foam with a maximum permeance of 1.5 perms at the installed thickness applied to the interior ~~cavity~~ side of wood structural panels, fiberboard, *insulating sheathing* or gypsum shall be deemed to meet the continuous insulation moisture control requirement ~~where the~~ in accordance with one of the following conditions:

1. The spray foam R-value meets or exceeds the specified continuous insulation R-value.
2. The combined R-value of the spray foam and continuous insulation is equal to or greater than the specified continuous insulation R-value.

Delete without substitution:

~~**1404.3.2 Hybrid insulation for moisture control with Class III vapor retarders.** For the purposes of compliance with Table 1404.3(3), the combined *R*-values of spray foam plastic insulation and continuous insulation shall be permitted to be counted toward the continuous *R*-value requirement.~~

Reason: This proposal aligns provisions for spray foam in the IBC with those in the IRC and, in doing so, applies the maximum 1.5 perm limit to both applications of spray foam (currently it is not consistently applied to Sections 1404.3.1 and 1404.3.2 which was the result of an inadvertent proposal correlation issue from the previous code development cycle). By moving the content of Section 1404.3.2 into Item #2 of 1404.3.1 it also simplifies and clarifies the IBC in following the format of the IRC. Also, this proposal ensures that these provision apply to both Class II and Class III vapor retarder tables which is consistent with the IRC and was intended for the IBC (but also not possible due to inability to correlate separate proposals last code cycle). Finally, the proposal deletes an "orphaned" footnote in Table 1404.3(4) that was intended to be deleted and replaced by the code text in Section 1404.3.1 as proposed here. In effect, this is a "clean-up" proposal for changes made in the last code cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not change the requirements or intent of the code and has no cost impact. However, in making the clarification and coordination with the IRC, it does extend the application of these spray foam provisions for use with Class II vapor retarder and continuous insulation which, in some cases, can reduce cost or provide more options for code compliance.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement and concluded the proposal aligns provisions for spray foam in the IBC with those in the IRC and, in doing so, applies the maximum 1.5 perm limit to both applications of spray foam. (Vote: 13-0)

Final Hearing Results

FS142-21	AS

FS143-21

Original Proposal

IBC: TABLE 1404.3(4)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1404.3(4) CONTINUOUS INSULATION WITH CLASS II VAPOR RETARDER

CLIMATE ZONE	PERMITTED CONDITIONS[a]
3	Continuous insulation with *R*-value ≥ R2
4, 5, 6	Continuous insulation with *R*-value ≥ R3 over 2 × 4 wall Continuous insulation with *R*-value ≥ R5 over 2 × 6 wall
7	Continuous insulation with *R*-value ≥ R5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R7.5 over 2 × 6 wall
8	Continuous insulation with *R*-value ≥ R7.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R10 over 2 × 6 wall

a. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class II vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*. ~~In addition to the vapor retarder, spray foam with a maximum permeance of 1.5 perms at the installed thickness, applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to comply with the continuous insulation requirement only for the moisture control purposes of this table where the spray foam *R*-value plus any continuous insulation *R*-value provided equals or exceeds the specified continuous insulation *R*-value.~~

Reason: This proposal addresses a correlation problem between two proposals from the 2018 code development cycle. This table and the existing footnote was added by proposal FS120-18, but the same footnote in existing Table 1404.3(3) was moved to text in Section 1404.3.1 by a different proposal. This proposal is doing the same thing for Table 1404.3(4) to remove a footnote that is redundant with the text in 1404.3.1. As another correlation fix, this proposal is also replacing the deleted footnote with a footnote that was added to Table 1404.3(3) last code cycle and which also should apply to Table 1404.3(4). These changes make Table 1404.3(4) consistent with the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal addresses a code correlation issue and does not change requirements. It has no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement and concluded that the existing footnote is not relevant to the table. (Vote: 13-0)

Final Hearing Results

FS144-21

Original Proposal

IBC: SECTION 202 (New), TABLE 1404.3(3)

Proponents: Theresa Weston, The Holt Weston Consultancy, LLC, The Holt Weston Consultancy, LLC (holtweston88@gmail.com)

2021 International Building Code

Add new definition as follows:

RAINSCREEN

.
An assembly applied to an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

Revise as follows:

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R2.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R7.5 over 2 × 6 wall
6	Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R7.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R11.25 over 2 × 6 wall
7	Continuous insulation with *R*-value ≥ R10 over 2 × 4 wall Continuous insulation with*R*-value ≥ R15 over 2 × 6 wall
8	Continuous insulation with *R*-value ≥ R12.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R20 over 2 × 6 wall

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, *rainscreens*, and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the International Energy Conservation Code.

Reason: Rainscreens are aa common and growing construction technique that is not material specific. The concept of cladding and substrates layers separated by a cavity that allows water to drain and air flow to accelerate drying is the most basic understanding of how a rainscreen system works. This proposal seeks to define the term *rainscreen* and to add to include*rainscreens* to the list of vented claddings that work in a system with Class III Vapor Retarder assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This does not add a new requirement but clarifies existing requirements and already existing option and so will not either increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

RAINSCREEN SYSTEM. An assembly applied to the exterior side of an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

Portions of table not shown remain unchanged.

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, *rainscreensrainscreen systems,* and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the International Energy Conservation Code.

Committee Reason: The committee concluded that the modification is an essential addition to clarify the exterior side of the exterior wall. Adding the word "system" is critical to guide to the appropriate system. The proposal defines an already used concept. (Vote: 13-0)

Final Hearing Results

FS144-21	AM

FS145-21

Original Proposal

IBC: 1404.4, 1404.4.1 (New)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1404.4 Flashing. Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect that moisture to the surface of the exterior wall finish or to a *water-resistive barrier* complying with Section 1403.2 and that is part of a means of drainage complying with Section 1402.2. Flashing shall be installed at the perimeters of exterior door and window assemblies in accordance with Section 1404.4.1, penetrations and terminations of *exterior wall* assemblies, *exterior wall* intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim. Where self-adhered membranes are used as flashings of *fenestration* in wall assemblies, those self-adhered flashings shall comply with AAMA 711. Where fluid applied membranes are used as flashing for *exterior wall* openings, those fluid applied membrane flashings shall comply with AAMA 714.

Add new text as follows:

1404.4.1 Fenestration flashing. Flashing of the fenestration to the wall assembly shall comply with the fenestration manufacturer's instructions or, for conditions not addressed by the fenestration manufacturer's instructions, shall comply with one of the following:

1. The *water-resistive barrier* manufacturer's flashing instructions;
2. The flashing manufacturer's flashing instructions;
3. A flashing design or method of a registered design professional; or,
4. Other *approved* methods.

Reason: This proposal clarifies the role of fenestration manufacturer instructions in accordance with Section 1404.13.1 with regard to flashing. The proposed new section provides a list of approved sources for flashing instructions where a flashing condition is not addressed in the fenestration manufacturer's flashing instructions. These instructions are separate from the structural installation requirements related to anchorage and support in IBC Section 1709.5, which will be addressed in the 2022 Group B code development cycle under the IBC Structural Committee.

Flashing instructions are necessary because the window product standard, NAFS or A440, addresses only water resistance of the fenestration unit itself, not the installation and performance of flashing at the fenestration to wall interface. Flashing of window and door penetrations involves multiple products including the window or door product, the flashing materials, and WRB materials used on a wall assembly. Each of these product manufacturers have a vested interest to ensure that their products are properly integrated with other wall components to ensure continuity of water resistance of the whole wall assembly. Therefore, each of these manufacturer's should be provided with an appropriate role or responsibility for achieving this goal.

More than one source for flashing instruction is often needed. Where fenestration manufacturers include instructions for flashing, they are often and necessarily limited in scope and unable to address every possible wall assembly condition. Therefore, this proposal is needed to ensure that WRB manufacturers, flashing manufacturers, designers, and others are provided with a mechanism to communicate their flashing instructions for interfacing walls with windows and doors.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is a clarification of current accepted practice and is consistent with similar concepts in the IRC.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee determined that the proposal is an essential topic to the wood industry and provides flexibility for the use of Fenestration flashing. The proponent is encouraged to look into the coordination of the proposed text since Section 1404.4 states "perimeters of exterior door and window assemblies in accordance with Section 1404.4.1"; however, fenestration flashing is only used with a glazed opening like windows. (Vote: 13-0)

Final Hearing Results

FS145-21	AS

FS146-21

Original Proposal

IBC: 1407.5 (New)

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com); William F Egan, Bill Egan Group LLC, EIFS Industry Members Association (EIMA) (bill@billegangroup.com)

2021 International Building Code

Add new text as follows:

1407.5 Exterior walls of buildings of any height. Exterior wall assemblies containing an EIFS *exterior wall covering* shall be tested in accordance with, and comply with the acceptance criteria of, NFPA 285 and comply with Section 2603.5.

Reason: This code proposal clarifies the fire testing requirements for EIFS systems and add a reference to Section 2603.5 to ensure the exterior wall assemblies with EIFS exterior wall coverings will comply with the relevant requirements for fire resistance (E119/UL 263), surface burning characteristics (E84/UL 723), vertical and lateral flame propagation (NFPA 285), and ignition resistance (NFPA 268). The current Section 1407.1 references, "…in addition to other applicable requirements of […] Chapter 26.," the new proposed Section 1407.5 provides clear and specific reference to the codified fire testing and fire performance requirements for exterior wall assemblies containing foam plastic insulation and associated exterior coatings and facings.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee indicated this is an unnecessary and unclear pointer. The fire testing criteria is already addressed in ASTM E2568. (Vote: 9-4)

Public Comments

Public Comment 1

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1407.5 Exterior walls of buildings of any height . Exterior wall assemblies containing an EIFS *exterior wall covering* shall ~~be tested in accordance with, and comply with the acceptance criteria of, NFPA 285 and~~ comply with Section 2603.5.

Commenter's Reason: FS146 was recommended for disapproval sincefire test requirements in section 2603.5 are contained in ASTM E 2568 (Standard Specification for Exterior Insulation and Finish Systems) which is referenced in section 1407.2.
The North American Modern Building Alliance requests FS146-21 to be approved as modified for the following reasons:

1. ASTM standards are living documents subject to change and modification at any time. Stakeholders, including Building Code officials, may not have ready access to the applicable edition of the ASTM standard that is in the code therefore a specific reference to section 2603.5 should be included under section 1407.
2. The addition of proposed section 1407.5 adds a clear pointer that will be helpful to all stakeholders (building code officials, design professionals, contractors, owners, etc.) as to the fire performance requirements for EIFS with foam plastic insulation.
3. NFPA 285 is a test requirement within section 2603.5 therefore the proposed modification removes this unnecessary reference, plus NFPA 285 only applies as set forth in 2603.5.

The proposed change and Public Comment are supported by EIMA, the EIFS industry trade association.

We respectfully request Approval as Modified by this Public Comment.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Final Hearing Results

FS146-21	AMPC1

FS149-21 Part I

Original Proposal

IBC: (New), SECTION 1409 (New), 1409.1 (New), 1409.2 (New), 1409.2.1. (New), 1409.2.2. (New), 1409.2.3 (New), 1409.3. (New), 1409.4. (New), 1409.5 (New), 1409.5.1. (New), 1409.5.2. (New), 1409.6. (New), 1409.7. (New), 1409.7.1. (New), 1409.7.1.1. (New), 1409.7.2. (New), 1409.7.2.1. (New), 1409.7.2.2 (New), 1409.7.3 (New), 1409.7.3.1. (New), 1409.7.3.2. (New), 1409.7.3.3. (New), 1409.7.3.4. (New), 1409.8. (New), 1409.9. (New), 1409.9.1. (New)

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com); Robert A. Zabcik, Metal Construction Association (MCA), Metal Construction Association (MCA) (bob@ztech-consulting.com)

2021 International Building Code

Add new definition as follows:

INSULATED METAL PANEL (IMP). A factory manufactured panel consisting of metal facings and an insulation core intended for use as a system forming an exterior wall, an exterior wall covering, a roof covering, or roof assembly of a building.

Add new text as follows:

SECTION 1409
INSULATED METAL PANEL (IMP)

1409.1 General. The provisions of this section shall govern the materials, construction, and quality of insulated metal panels (IMP) for use as exterior walls and exterior wall coverings in addition to other applicable requirements of Chapters 14 and 16.

1409.2 Structural design. Structural design of IMP systems shall be in accordance with this section.

1409.2.1. IMP systems used as exterior walls. IMP systems used as exterior wall shall be designed and constructed to resist design loads in accordance with applicable provisions of Chapter 16.

1409.2.2. IMP systems used as exterior wall coverings. IMP systems used as exterior wall covering systems shall be designed and constructed to resist wind loads as required by Section 1609.

1409.2.3 Approval. Results of approved tests or engineering analysis shall be submitted to the building official to verify compliance with the applicable requirements of Chapter 16.

1409.3. Weather resistance. IMP systems shall comply with Section 1402 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer's installation instructions.

1409.4. Durability. IMP systems shall be constructed of approved materials that maintain the performance characteristics required in section 1402 for the duration of use.

1409.5 Fire-resistance rating. Evidence of the required fire resistance rating of IMPs systems shall be in accordance with this section.

1409.5.1. IMP used as exterior walls. In all types of construction where IMP systems are used as exterior wallsrequired to have a fire resistance rating in accordance with Section 705, evidence shall be submitted to the building official that the wall achieves the required fire-resistance rating.

1409.5.2. IMP used as exterior wall coverings. IMP used as exterior wall coverings. In all types of construction where IMP systems are used as exterior wall coverings on exterior walls required to have a fire resistance rating in accordance with section 705, evidence shall be submitted to the building official that the required fire-resistance rating is maintained.

Exception: IMP systems not containing combustible insulation, which are installed on the outer surface of a fire-resistance rated exterior wall in a manner such that the attachments do not penetrate to the entire exterior wall assembly, shall not be required to comply with this section.

1409.6. IMP with noncombustible core insulation. IMP with noncombustible core insulation shall comply with Sections 1409.1 through 1409.5. Combustibility shall be determined in accordance with Section 703.3.

1409.7. IMP Systems with combustible core insulation. IMP systems with combustible core insulation shall comply with Sections 1409.1 through 1409.5 and this section. Combustibility shall be determined in accordance with Section 703.3.

1409.7.1. Surface-burning characteristics. Unless otherwise specified in this section, the combustible core shall have a flame spread index of 75 or less and a smoke developed index of 450 or less when tested in the maximum thickness intended for use, but not to exceed 4 inches (102 mm), in accordance with ASTM E84 or UL 723. For thickness greater than 4 inches (102 mm) the combustible core shall have a flame spread index of 75 or less and a smoke developed index of 450 or less at 4 inches (102 mm) thickness and the IMP approved based on testing in accordance with 1409.7.2.2 at the maximum IMP thickness intended for use.

1409.7.1.1. Foam plastic core. For IMP having a core insulation composed of foam plastic, the insulation core shall comply with Section 2603.3.

1409.7.2. Thermal Barrier. Unless otherwise specified in this section, IMP with combustible core shall be separated from the interior of a building by an approved thermal barrier consisting of 1/2 -inch (12.7 mm) gypsum wallboard or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

1409.7.2.1. Foam plastic core. For IMP having a foam plastic core, use with the thermal barrier prescribed in Section 1409.7.2 shall be in accordance with Section 2603.4 unless special approval is obtained on the basis of Section 2603.9.

1409.7.2.2 Special approval. The thermal barrier specified Section 1409.7.2 is not required where IMP is specifically approved based on tests conducted in accordance with, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.1.1.1), FM 4880 or UL 1715. Such testing shall be performed with the IMP in a configuration related to the actual end-use and at the maximum thickness intended for use, and shall include seams, factory joints and other typical details used sealants intended for use.

1409.7.3 Type I, II, III, and IV construction. Where used as exterior walls or as exterior wall coverings on buildings of Type I, II, III, and IV construction, IMP systems shall comply with this section as follows:

1. IMP having a foam plastic core shall comply with Section 2603.5.
2. IMP having combustible core other than foam plastic shall comply with Sections 1409.7.3.1 through 1409.7.3.4.

1409.7.3.1. Surface-burning characteristics. The combustible core shall have a flame spread index of 25 or less and a smoke developed index of 450 or less when tested in the maximum thickness intended for use, but not to exceed 4 inches (102 mm), in accordance with ASTM E84 or UL 723. For thickness greater than 4 inches (102 mm) the combustible core shall have a flame spread index of 75 or less and a smoke developed index of 450 or less at 4 inches (102 mm) thickness and the IMP approved based on testing in accordance with 1409.7.2.2 at the maximum IMP thickness intended for use.

1409.7.3.2. Thermal barrier. IMP shall be separated from the interior of a building by an approved thermal barrier in accordance with Section 1409.7.2.

1409.7.3.3. Vertical and lateral flame propagation. IMP installations greater than 40 feet (12,192 mm) in height above grade plane shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. Such testing shall be performed on the exterior wall assembly and with the IMP in the maximum thickness intended for use.

1409.7.3.4. Ignition. IMP installations shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 1409.7.2.
2. A minimum 1-inch (25 mm) thickness of concrete or masonry.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of 3/8 inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inch-thick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum 7/8-inch (22.2 mm) thickness of stucco complying with Section 2510.
6. A minimum 1/4-inch (6.4 mm) thickness of fiber-cement lap, panel or shingle siding complying with Section 1404.16 and Section 1404.16.1 or 1404.16.2.

1409.8. Type V construction. IMP shall be permitted for use in Type V construction.

1409.9. Labeling. Unless otherwise specified, the edge or face of each IMP or package shall bear the label of an approved agency. The label shall contain the manufacturer's or distributor's identification, model number, serial number or definitive information describing the product or materials' performance characteristics and approved agency's identification.

1409.9.1. Foam plastic core. IMP having a foam plastic core shall be labeled in accordance with Section 2603.2 and 2603.5.6, as applicable.

Reason: The new proposal introduces a new definition of insulated metal panel (IMPs) products specifically designed and used for exterior wall and exterior wall covering applications of the building assembly.

Insulated Metal Panel (*IMP*) systems are construction materials comprised of factory-manufactured panels composed of an insulation core with metal facers. The insulation core of *IMP* panels is either combustible (e.g. foam plastic) or noncombustible (e.g. mineral wool) where the metal facers are most typically, but not limited to, steel. Applications of *IMP* include exterior walls, exterior wall coverings, roof assemblies, and roof coverings. The proposed new section focuses on exterior wall and exterior wall covering applications. It is important to note that *IMP* systems are very different from metal composite metal (MCM) exterior wall covering systems and have distinctly different performance requirements.

This proposal creates a new and separate section under Chapter 14 to ensure differentiation from MCM systems and to collect the relevant requirements and appropriate references for applications of *IMP* related to exterior walls and exterior wall coverings. The establishment of a section within Chapter 14 devoted to*IMP*s will simplify the identification and interpretation of code requirements for designers and manufacturers, and to assist building officials with compliance enforcement. The proposed new section does not change any of the current IBC requirements that are typically applied to *IMP*s. It simply collects them into a single section.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal provides important criteria for new technology (Insulated Metal Panels (IMP)). (Vote: 13-0)

Final Hearing Results

FS149-21 Part I	AS

FS149-21 Part II

Original Proposal

IBC: 2603.4.1.4

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com); Robert A. Zabcik, Metal Construction Association (MCA), Metal Construction Association (MCA) (bob@ztech-consulting.com)

2021 International Building Code

Revise as follows:

2603.4.1.4 Exterior walls, one-story buildings. ~~For one-*story* buildings, foam plastic having a *flame spread index* of 25 or less, and a *smoke-developed index* of not more than 450, shall be permitted without thermal barriers in or on *exterior walls* in a thickness not more than 4 inches (102 mm) where the foam plastic is covered by a thickness of not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a base metal thickness of 0.0160 inch (0.41 mm) and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~ For *exterior walls* of one-story buildings constructed of *insulated metal panels (IMP)* with *foam plastic insulation* cores, the thermal barrier is not required when all of the following apply:

1. The *foam plastic insulation* thickness is not more than 4 inches (102 mm)
2. The *foam plastic insulation* core has a flame spread index of 25 or less and a smoke developed index of 450 or less.
3. The *foam plastic insulation* is covered by a thickness of not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a base metal thickness of 0.0160 inch (0.41 mm).
4. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Reason: The new proposal introduces a new definition of insulated metal panel (IMPs) products specifically designed and used for wall and roof applications of the building assembly. Insulated Metal Panel (*IMP*) systems are construction materials comprised of factory-manufactured panels composed of an insulation core with metal facers. The insulation core of *IMP* panels is either combustible (e.g. foam plastic) or noncombustible (e.g. mineral wool) where the metal facers are most typically, but not limited to, steel. Applications of *IMP* include exterior walls, exterior wall coverings, roof assemblies, and roof coverings. It is important to note that *IMP* systems are very different from metal composite metal (MCM) exterior wall covering systems and have distinctly different performance requirements. The proposal also reorganizes the criteria listed in the charging statement into an itemized list.
The intended scope of Section 2603.4.1.4 is for metal-faced panels with foam plastic cores in the limited application of storage buildings and is discussed in the 2018 IBC Code Commentary to Section 2603.4.1.4:

This provision is intended to permit the use of metal-faced panels, primarily in storage buildings other than cold storage construction. Cold storage construction was also covered in this section (see also Sections 2603.4.1.2 and 2603.4.1.3, and Section 2603.3, Exception 2). The limitations are based on the results of large-scale tests performed by independent laboratories and sponsored by the plastics industry.

In current construction practice, these "metal-faced panels" have evolved to become Insulated Metal Panel (IMP) systems. This proposal closes a potential loophole regarding general NFPA 285 testing, clarifying that only a one-story building composed of a specific wall construction applies to Exception 1 contained in current Section 2603.5.5. The reference to Section 2603.4.1.4 in Exception 1 of Section 2603.5.5 is often used as justification to exempt exterior walls of Type I, II, III, and IV construction containing foam plastic insulation from having to comply with NFPA 285. The charging language of 2603.4.1.4 does not provide sufficient information to clearly convey the intent of the thermal barrier exception and, by its reference in 2603.5.5 Exception 1, the extension to the exception for compliance with NFPA 285.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal clarifies the criteria for insulated metal panels (IMP). (Vote: 13-0)

Final Hearing Results

FS149-21 Part II	AS

FS150-21

Original Proposal

IBC: SECTION 1410 (New), 1410.1 (New)

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

SECTION 1410
BIPV SYSTEMS FOR EXTERIOR WALL COVERINGS AND FENESTRATION

1410.1 Listing required. In addition to complying with other provisions of this code, BIPV systems used as exterior wall coverings or fenestration shall be listed and labeled in accordance with UL 1703 or both UL 61730-1 and UL 61730-2.

Reason: Building Integrated Photovoltaic (BIPV) Systems are increasingly becoming popular due to efforts to achieve Net Zero Energy. Requirements for BIPV Systems used as roof assemblies and roof coverings are already addressed in Chapter 15. New applications for BIPV systems are systems that are used as either exterior wall coverings or fenestration. The IBC is silent on the requirements for such systems. Chapter 14 contains a variety of requirements for exterior wall coverings and exterior wall assemblies. Clearly, if BIPV systems are included in exterior walls they should comply with all such requirements (including fire tests and weather protection). In addition to those requirements, this proposal requires that BIPV systems be listed and labeled in accordance with the applicable UL standards. Note these UL standards are already addressed in the IBC.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal clarifies what requirements apply to BIPV systems used as an exterior wall covering or fenestration.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides needed installation guidelines for BIPV systems used as exterior wall coverings or fenestration to be listed and labeled. The committee also mentioned that the safety glazing issue and adding duality to those products need to be addressed. The committee suggested including a general reference to chapter 14. (Vote: 9-4)

Final Hearing Results

FS150-21 AS

FS152-21

Original Proposal

IBC: 2603.1.2 (New), TABLE 2603.1 (New)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Add new text as follows:

2603.1.2 Insulating Sheathing. Foam plastic materials used as *insulating sheathing* shall comply with the provisions of Section 2603 and the material standards in Table 2603.1.

TABLE 2603.1 MATERIAL STANDARDS FOR FOAM PLASTIC INSULATING SHEATHING

Expanded Polystyrene (EPS)	ASTM C578
Extruded Polystyrene (XPS)	ASTM C578
Polyisocyanurate	ASTM C1289

Reason: In the last code cycle, a material standard for spray-applied foam plastic (ICC-1100) was added in Section 2603.1.1. The foam plastic insulating sheathing industry would like to add their material standards through the addition of Section 2603.1.2 and Table 2603.1. These are the current product standards referenced in Table 1508.2 for roof applications. But, the applications of these materials extend beyond roofs and, therefore, the material standards should be referenced in Chapter 26. No specific product types (e.g., Type I, Type II, etc.) are specified because Chapter 26 covers a wide range of product applications including floors, walls, roofs, etc.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal recognizes existing material standards applicable to Chapter 26 and, therefore, has no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal appropriately adds material standards for foam plastic insulating sheathing through the addition of Section 2603.1.2 and Table 2603.1. (Vote: 13-0)

Final Hearing Results

FS152-21 AS

FS153-21

Original Proposal

IBC: 2603.4.1.4. (New)

Proponents: Paul Duffy, Paul Duffy and Associates, American Chemistry Council - Spray Foam Coalition (pduffy@jpaduffy.com)

2021 International Building Code

Add new text as follows:

2603.4.1.4. Separately controlled climate structures. In nonsprinklered buildings, foam plastic having a thickness that does not exceed 4 inches (102 mm) and a maximum flame spread index of 75 is permitted in separately controlled climate structures where the aggregate floor area does not exceed 400 square feet (37 m2) and the foam plastic is covered by a metal facing not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41mm). A thickness of up to 10 inches (254 mm) is permitted where protected by a thermal barrier.

Reason: Section 2603.4.1.3 describes interior finishes protecting foam plastic in freezers and walk in coolers. This section requires foam plastic to be covered by a metal facing not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41mm). A maximum thickness of 4 inches (102 mm) of foam plastic insulation is provided; up to 10 inches (254 mm) is permitted where foam is protected by a thermal barrier. The limitation on the size of these structures is 400 square feet and the limitations on foam plastic are a maximum flame spread index of 75. For reference, the existing section 2603.4.1.3: reads as follows:

2603.4.1.3. Walk-in coolers. In nonsprinklered build-ings, foam plastic having a thickness that does not exceed 4 inches (102 mm) and a maximum flame spread index of 75 is permitted in walk-in coolers or freezer units where the aggregate floor area does not exceed 400 square feet (37 m2) and the foam plastic is covered by a metal facing not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41mm). A thickness of up to 10 inches (254 mm) is permitted where protected by a thermal barrier.

Currently, there are no specific requirements for foam used in controlled climate buildings that are separate or adjacent to structures. The proposed new section would set similar design requirements (i.e. similar to those in Section 2603.4.1.3) for “separately controlled climate spaces” that are not intended for normal occupancy. Typical uses for these spaces might include equipment rooms that require separate conditioning (usually cooling), rooms for protecting certain foods and liquids from freezing (requiring basic heating to above freezing temperatures), etc. Like Section 2603.4.1.3, a size limitation of 400 square feet for these structures would apply.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal seeks to clarify requirements to make design criteria similar to similar types of structures.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2603.4.1.4.Separately controlled climate structures.
In nonsprinklered buildings of Group U, foam plastic having a thickness that does not exceed 4 inches (102 mm) and a maximum flame spread index of 75 is permitted in separately controlled climate structures where the aggregate floor area does not exceed 400 square feet (37 m2) and the foam plastic is covered by a metal facing not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41mm). A thickness of up to 10 inches (254 mm) is permitted where protected by a thermal barrier.

Committee Reason: The committee concluded that the modification appropriately limits the use of the new section by adding "Group U". The proposed new section sets design requirements (i.e. similar to those in Section 2603.4.1.3) for separately controlled climate structures. (Vote: 13-0)

Final Hearing Results

FS153-21	AM

FS154-21

Original Proposal

IBC: 713.8

Proponents: Richard Grace, Fairfax County, Virginia, Fairfax County, Virginia (richard.grace@fairfaxcounty.gov)

2021 International Building Code

Revise as follows:

713.8 Penetrations. Penetrations in a *shaft enclosure* shall be protected in accordance with Section 714 as required for*fire barriers* or *horizontal assemblies* or both. Structural elements, such as beams or joists, where protected in accordance with Section 714 shall be permitted to penetrate a *shaft enclosure.*

Reason: Section 713.2 states that a shaft shall be constructed asfire barriers or horizontal assemblies or both. In the 2006 code, “horizontal assemblies” was added to Section 713.2, but was not reflected in the penetrations section of 713.8. This change coordinates the penetration requirements with the current language for shaft construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification change which shouldn't effect the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee concluded the proposal provides consistency and recognizes that there are other components of the shafts that are horizontal. (Vote: 13-0)

Final Hearing Results

FS154-21	AS

FS155-21

Original Proposal

IBC: 803.13

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Building Code

Revise as follows:

803.13 Interior finish requirements based on occupancy. *Interior wall and ceiling finish* shall have a classification ~~*flame spread index*~~ not less ~~greater~~ than that specified in Table 803.13 for the group and location designated. *Interior wall and ceiling finish* materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

Reason: This is a simple editorial change, as referenced in Table 803.13 are not just about flame spread but are also include the smoke developed index, so it should reference the complete classification as defined in Section 803.1.2 (i.e. A, B, C).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simply editorial.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
803.13Interior finish requirements based on occupancy.
Interior wall and ceiling finish shall have a classification such that the flame spread index and smoke developed index values are not higher than those corresponding to the classification ~~not less than that~~ specified in Table 803.13 for the group and location designated. *Interior wall and ceiling finish* materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

Committee Reason: The committee concluded the modification clarifies the intent of the proposal and incorporates the proper terminology. The proposal clarifies the intent of the code. (Vote: 12-0)

Final Hearing Results

FS155-21	AM

FS156-21

Original Proposal

IBC: 1403.9, 1403.12

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Building Code

Revise as follows:

1403.9 Vinyl siding. Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D3679 by an *approved* ~~quality control~~ agency.

1403.12 Polypropylene siding. *Polypropylene siding* shall be certified and labeled as conforming to the requirements of D7425/D7425M–13 and those of Section 1403.12.1 or 1403.12.2 by an approved ~~quality control~~ agency. *Polypropylene siding* shall be installed in accordance with the requirements of Section 1404.18 and in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.

Reason: This change is a simple edit to these sections of the code that make it in line with the defined term "approved agency". The term "approved quality control agency" is not defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1403.10Fiber-cement siding.
Fiber-cement siding
shall conform to the requirements of ASTM C1186, Type A (or ISO 8336, Category A), and shall be so identified on labeling listing an *approved* ~~quality control~~ agency.

Committee Reason: The committee concluded the modification corrects the other missing section 1403.10, Fiber-cement siding. The proposal clarifies the current code text since the term "approved quality control agency" is not defined. "approved agency" is a defined term. (Vote: 12-0)

Final Hearing Results

FS156-21	AM

FS157-21

Original Proposal

IBC: 1405.1.1

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, North American Modern Building Alliance (jgreenwald@operativegreenwald.com)

2021 International Building Code

Revise as follows:

1405.1.1 Types I, II, III and IV construction. On buildings of Types I, II, III and IV construction, *exterior wall coverings* shall be permitted to be constructed of combustible materials, complying with the following limitations:

1. Combustible *exterior wall coverings* shall not exceed 10 percent of an *exterior wall* surface area where the *fire separation distance* is 5 feet (1524 mm) or less.
2. Combustible *exterior wall coverings* shall be limited to 40 feet (12 192 mm) in height above *grade plane*.

   Exceptions:

   1. *Metal composite material (MCM) systems* complying with Section 1406.
   2. *Exterior insulation and finish systems (EIFS)* complying with Section 1407.
   3. *High-pressure decorative exterior-grade compact laminate (HPL)* systems complying with Section 1408.
   4. Exterior wall coverings containing *foam plastic insulation* complying with Section 2603.5.

3. Combustible *exterior wall coverings* constructed of *fire-retardant-treated wood* complying with Section 2303.2 for exterior installation shall not be limited in wall surface area where the *fire separation distance* is 5 feet (1524 mm) or less and shall be permitted up to 60 feet (18 288 mm) in height above *grade plane* regardless of the *fire separation distance*.
4. Wood *veneers* shall comply with Section 1404.5.

Reason: Section 1405.1.1 permits limited use of combustible exterior wall coverings on Types I – IV construction, however, there is a conflict that requires correction. Limitation #2 (maximum 40-ft in height) conflicts with other sections in Chapters 14 and 26 containing provisions for these exterior wall assemblies and exterior wall covering installations that are greater than 40-ft. in height.
Multiple other sections of Chapter 14 (1406, 1407, and 1408) and Section 2603.5 more specifically address uses of materials in exterior wal assemblies beyond the 40-ft height limitation when successful testing to NFPA 285 is demonstrated. This proposal provides appropriate exceptions to Limitation 2 and references to those sections of the Code providing the applicable information regarding use on Types I-IV construction greater than 40-ft in height.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1405.1.1Types I, II, III and IV construction.
On buildings of Types I, II, III and IV construction,*exterior wall coverings* shall be permitted to be constructed of combustible materials, complying with the following limitations:

1. Combustible *exterior wall coverings* shall not exceed 10 percent of an *exterior wall* surface area where the *fire separation distance* is 5 feet (1524 mm) or less.
2. Combustible *exterior wall coverings* shall be limited to 40 feet (12 192 mm) in height above*grade plane*.

   Exceptions:

   1. *Metal composite material (MCM) systems* complying with Section 1406.
   2. *Exterior insulation and finish systems (EIFS)* complying with Section 1407.
   3. *High-pressure decorative exterior-grade compact laminate (HPL)* systems complying with Section 1408.
   4. Exterior wall coverings containing *foam plastic insulation* complying with Section 2603~~.5~~

3. Combustible *exterior wall coverings* constructed of *fire-retardant-treated wood* complying with Section 2303.2 for exterior installation shall not be limited in wall surface area where the *fire separation distance* is 5 feet (1524 mm) or less and shall be permitted up to 60 feet (18 288 mm) in height above *grade plane* regardless of the *fire separation distance*.
4. Wood *veneers* shall comply with Section 1404.5.

Committee Reason: The committee concluded that the modification is necessary to refer to all the requirements in section 2603. The proposal fixes many conflicts by providing the appropriate exceptions to Limitation 2 and references to those sections of the Code providing the applicable information regarding use on Types I-IV construction greater than 40-ft in height. (Vote: 13-0)

Final Hearing Results

FS157-21	AM

FS158-21

Original Proposal

IBC: 1405.1.1
Proponents: James Smith, American Wood Council, American Wood Council (jsmith@awc.org)

2021 International Building Code

Revise as follows:

1405.1.1 Types I, II, III and IV-HT construction. On buildings of Types I, II, III and IV-HT construction, *exterior wall coverings* shall be permitted to be constructed of combustible materials, complying with the following limitations:

1. Combustible *exterior wall coverings* shall not exceed 10 percent of an *exterior wall* surface area where the *fire separation distance* is 5 feet (1524 mm) or less.
2. Combustible *exterior wall coverings* shall be limited to 40 feet (12 192 mm) in height above *grade plane*.
3. Combustible *exterior wall coverings* constructed of *fire-retardant-treated wood* complying with Section 2303.2 for exterior installation shall not be limited in wall surface area where the *fire separation distance* is 5 feet (1524 mm) or less and shall be permitted up to 60 feet (18 288 mm) in height above *grade plane* regardless of the *fire separation distance*.
4. Wood *veneers* shall comply with Section 1404.5.

Reason: The provision to allow exterior wall coverings to be of combustible materials is inconsistent with the exterior walls covering requirements for Type IV-A, IV-B, and IV-C. Even though this subsection is limited to walls that are no more than 40 ft. in height (limitation 2.) and 60 ft. in height (limitation 3.) there is no similar allowance for Type IV-A, IV-B and IV-C. Prior to the 2021 IBC, Type IV (now designated Type IV-HT) exterior walls coverings were regulated by this section and this change maintains that historical allowance without creating a conflict with the exterior wall protection requirements in subsections 602.4.1.1 (Type IV-A), 602.4.2.1 (Type IV-B) and 602.4.3.1 (Type IV-C). Section 602.4 clearly prohibits all combustible material of any height on the outside of exterior walls in Types IV-A, IV-B, and IV-C. This proposal eliminates a oversight that creates a conflict in the current code. This does not effect the requirement for noncombustible protection of 40 minutes on the exterior side of exterior walls in those types of construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
We feel this change is essentially editorial in nature in that it is only clarifying this allowance should only apply to Type IV-HT, rather than including the new Types IV-A, IV-B and IV-C.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee indicated this is a legacy requirement based on legacy understanding; the addition of HT is an appropriate update of the code text. (Vote: 12-0)

Final Hearing Results

FS158-21	AS

FS159-21

Original Proposal

IBC: 901.6, 901.6.1, [F] 901.6.2, [F] 901.6.2.1, [F] 901.6.2.2, 901.6.3, 901.6.4

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

901.6 Supervisory service. Where required, *fire protection systems* shall be monitored by an approved supervising station in accordance with NFPA 72.

901.6.1 Automatic sprinkler systems. *Automatic sprinkler systems* shall be monitored by an *approved* supervising station.

Exceptions:

1. A supervising station is not required for *automatic sprinkler systems* protecting one- and two-family dwellings.
2. Limited area systems in accordance with Section 903.3.8.

Delete without substitution:

~~**[F] 901.6.2 Integrated testing.** Where two or more fire protection or *life safety systems* are interconnected, the intended response of subordinate fire protection and *life safety systems* shall be verified when required testing of the initiating system is conducted. In addition, integrated testing shall be performed in accordance with Sections 901.6.2.1 and 901.6.2.2.~~

~~**[F] 901.6.2.1 High-rise buildings.** For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.~~

~~**[F] 901.6.2.2 Smoke control systems.** Where a fire alarm system is integrated with a smoke control system as outlined in Section 909, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.~~

Revise as follows:

901.6.2 ~~901.6.3~~ Fire alarm systems. Fire alarm systems required by the provisions of Section 907.2 of this code and Sections 907.2 and 907.9 of the International Fire Code shall be monitored by an *approved* supervising station in accordance with Section 907.6.6 of this code.

Exceptions:

1. Single- and multiple-station smoke alarms required by Section 907.2.11.
2. Smoke detectors in Group I-3 occupancies.
3. Supervisory service is not required for *automatic sprinkler systems* in one- and two-family dwellings.

901.6.3 ~~901.6.4~~ Group H. Supervision and monitoring of emergency alarm, detection and automatic fire-extinguishing systems in Group H occupancies shall be in accordance with the *International Fire Code*.

Reason: Editorial. The deleted text is sourced from material added to IFC Section 901.6 in 2021. However, while the IBC and IFC both include sections numbered as 901.6, IBC Section 901.6 is a different topic, and the IFC text for the same section number should not have been duplicated in the IBC, which is not scoped to include ITM.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial. No cost impact.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee determined the proposal clarifies the appropriate place for inspection testing and maintenance of existing systems. The IFC, which is the maintenance code, is more relevant than the IBC construction code. (Vote: 14-0)

Final Hearing Results

FS159-21	AS

FS160-21

Original Proposal

IBC: 603.1, [F] 806.5, [F]806.6, 806.6.1 (New), [F]806.7, [F]806.8, [F]806.9

Proponents: Marcelo Hirschler, GBH International, self (mmh@gbhint.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Delete without substitution:

~~**[F] 806.5 Foam plastic**~~. ~~Foam plastic used as *trim* in any occupancy shall comply with Section 2604.2~~.

Revise as follows:

[F] ~~806.6~~ 806.5 Pyroxylin plastic. Imitation leather or other material consisting of or coated with a pyroxylin or similarly hazardous base shall not be used in Group A occupancies.

[F] ~~806.7~~ 806.6 Interior trim. Material, other than foam plastic used as interior *trim*, shall have a minimum Class C *flame spread* and *smoke-developed index* when tested in accordance with ASTM E84 or UL 723, as described in Section 803.1.2. Combustible *trim*, excluding handrails and guardrails, shall not exceed 10 percent of the specific wall or ceiling area to which it is attached.

Add new text as follows:

806.6.1 Foam plastic. Foam plastic used as interior trim in any occupancy shall comply with Section 2604.2.

Revise as follows:

[F] ~~806.8~~ 806.7 Interior floor-wall base. *Interior floor-wall base* that is 6 inches (152 mm) or less in height shall be tested in accordance with Section 804.2 and shall be not less than Class II. Where a Class I floor finish is required, the floor-wall base shall be Class I.

Exception: Interior *trim* materials that comply with Section 806.7.

[F] ~~806.9~~ 806.8 Combustible lockers. Where lockers constructed of combustible materials are used, the lockers shall be considered to be *interior finish* and shall comply with Section 803.

Exception: Lockers constructed entirely of wood and noncombustible materials shall be permitted to be used wherever *interior finish* materials are required to meet a Class C classification in accordance with Section 803.1.2.

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*

   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

   1.3. Roof construction, including girders, trusses, framing and decking.

   Exceptions:

   1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
   2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A *roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

   1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.6 ~~806~~.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.

16. Mastics and caulking materials applied to provide flexible seals between components of*exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of*fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

Reason: This is simply an editorial change. Presently Section 603.1 item 8 refers "trim" to section 806 but section 806 contains other materials than trim and the definition of trim as "Picture molds, chair rails, baseboards, handrails, door and window frames and similar decorative or protective materials used in fixed applications." might lead users to think that all of that is covered, including items such as decorative materials. In section 806, foam plastic trim is covered in 806.5 and interior trim is covered in 806.7). Foam plastic trim should be a subsection of interior trim and section 603 should refer to the trim section. This proposal just moves sections around without changing the intended meaning.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply moves sections around to improve the usability.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that the foam plastic trim should be a subsection of interior trim and Section 603 should refer specifically to Section 806.6. The proposal clarifies the requirements without technical changes. (Vote: 14-0)

Final Hearing Results

FS160-21 AS

G1-22 Part I

Original Proposal

PART I - IBC: SECTION 202; IFC: SECTION 202; IEBC: SECTION 202 (New)

PART 2: IRC: SECTION 202

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhinternational.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] GYPSUM BOARD.
A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing.
~~The generic name for a family of sheet products consisting of a noncombustible core primarily of gypsum with paper surfacing.~~

[BS] GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum complying with the standards specified in Table 2506.2 and Table 2507.2, and Chapter 35. ~~*Gypsum board*and*glass mat gypsum panels* are examples of *gypsum panel products*.~~

[BS] GYPSUM SHEATHING. *Gypsum panel products* specifically manufactured with enhanced water resistance for use as a substrate for exterior surface materials.

[BS] GYPSUM WALLBOARD. A *gypsum board* used primarily as an interior surfacing for building structures.

Reason: This clarifies the term already used in the code and more closely harmonizes the terms and definitions to what is being used by ASTM and the industry than what currently exists.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply clarifies the terms and harmonizes to what is being used by ASTM and the industry.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted consistent with actions on G1-22 Part II. (Vote: 14-0)

Final Hearing Results

G1-22 Part I	AS

G1-21 Part II

Original Proposal

PART II - IFC: SECTION 202, 504.1, 509.2, 701.6, 2309.5.2.1, 3206.10.1.1, D102.1, L104.6, L104.14.1; IBC: [F] 415.11.7.4, [F] 914.1.1; ICCPC: [F] 2001.3.6

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] 415.11.7.4 Installations in corridors and above other occupancies. The installation of HPM piping and tubing within the space defined by the walls of corridors and the floor or roof above, or in concealed spaces above other occupancies, shall be in accordance with Sections 415.11.7.1 through 415.11.7.3 and the following conditions:

1. Automatic sprinklers shall be installed within the space unless the space is less than 6 inches (152 mm) in the least dimension.
2. *Ventilation* not less than six air changes per hour shall be provided. The space shall not be used to convey air from any other area.
3. Where the piping or tubing is used to transport HPM liquids, a receptor shall be installed below such piping or tubing. The receptor shall be designed to collect any discharge or leakage and drain it to an *approved* location. The 1-hour enclosure shall not be used as part of the receptor.
4. HPM supply piping and tubing and nonmetallic waste lines shall be separated from the corridor and from occupancies other than Group H-5 by *fire barriers* or by an approved method or assembly that has a *fire-resistance rating* of not less than 1 hour. Access openings into the enclosure shall be protected by approved fire-protection-rated assemblies.
5. ~~Readily accessible manual~~ Ready access to manual or automatic remotely activated fail-safe emergency shutoff valves shall be installed on piping and tubing other than waste lines at the following locations:
   - 5.1. At branch connections into the *fabrication area*.
   - 5.2. At entries into *corridors*.

Exception: Transverse crossings of the *corridors* by supply piping that is enclosed within a ferrous pipe or tube for the width of the *corridor* need not comply with Items 1 through 5.

[F] 914.1.1 Exterior access to shaftways. Outside openings ~~accessible~~ with access to the fire department and that open directly on a hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with the word “SHAFTWAY” in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible from the outside of the building.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed ‘door’ from the definitions for ‘access (to)’ and ‘ready access (to)’. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal replaces an improper term with the proper term for the conditions listed. (Vote: 12-0)

Final Hearing Results

G1-21 Part II	AS

G1-21 Part III

Original Proposal

PART III - IFGC: 403.11.7, 404.8.2, 404.14.2, 409.5.3, 409.6, 411.1.6, 501.7.3, 503.5.9, 503.12.6

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Fuel Gas Code

Revise as follows:

403.11.7 Lapped flanges. Lapped flanges shall be used only above ground or in exposed locations~~accessible~~ with access for inspection.

404.8.2 Conduit with both ends terminating indoors. Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in ~~an accessible~~ a portion of the building with access and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.

404.14.2 Conduit with both ends terminating indoors. Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in ~~an accessible~~ a portion of the building with access and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.

409.5.3 Located at manifold. Where the *appliance* shutoff valve is installed at a manifold, such shutoff valve shall be located within 50 feet (15 240 mm) of the *appliance* served and shall ~~be readily accessible~~ have ready access and be permanently identified. The *piping* from the manifold to within 6 feet (1829 mm) of the *appliance* shall be designed, sized and installed in accordance with Sections 401 through 408.

409.6 Shutoff valve for laboratories. Where provided with two or more fuel gas outlets, including table-, bench- and hood-mounted outlets, each laboratory space in educational, research, commercial and industrial *occupancies* shall be provided with a single dedicated shutoff valve through which all such gas outlets shall be supplied. The dedicated shutoff valve shall ~~be readily accessible~~ have ready access, be located within the laboratory space served, be located adjacent to the egress door from the space and shall be identified by *approved* signage stating “Gas Shutoff.”

411.1.6 Unions. A union fitting shall be provided for *appliances* connected by rigid metallic pipe. Such unions shall~~be accessible~~ have access and be located within 6 feet (1829 mm) of the *appliance*.

501.7.3 Connection to masonry fireplace flue. A connector shall extend from the *appliance* to the flue serving a masonry *fireplace* such that the flue gases are exhausted directly into the flue. The connector shall ~~be accessible~~ have access or be removable for inspection and cleaning of both the connector and the flue. *Listed* direct connection devices shall be installed in accordance with their listing.

503.5.9 Cleanouts. Where a chimney that formerly carried flue products from liquid or solid fuel-burning appliances is used with an *appliance* using fuel gas, ~~an accessible~~ a cleanout with access shall be provided. The cleanout shall have a tight-fitting cover and shall be installed so its upper edge is not less than 6 inches (152 mm) below the lower edge of the lowest chimney inlet opening.

503.12.6 Positioning. Draft hoods and draft regulators shall be installed in the position for which they were designed with reference to the horizontal and vertical planes and shall be located so that the relief opening is not obstructed by any part of the *appliance* or adjacent construction. The *appliance* and its draft hood shall be located so that the relief opening~~is accessible~~ has access for checking vent operation.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

G1-21 Part III AS

G1-21 Part IV

Original Proposal

PART IV - IPC: 1302.9; IBC: [P]1210.2.2; ICCPC: [P]1204.3.3

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[P] 1210.2.2 Walls and partitions. Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture.

Exception: This section does not apply to the following buildings and spaces:

1. Dwelling units and *sleeping units*.
2. Toilet rooms that are not ~~accessible to the~~ for use by the general public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed ‘door’ from the definitions for ‘access (to)’ and ‘ready access (to)’. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were

numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Although the intent of the proposal is understood, including the word "easy" continues a poor code text practice. Either something has access (see defined term) or it doesn't. (14-0)

Public Comments

Public Comment 1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

1302.9 Pumping and control system . Mechanical equipment including pumps, valves and filters shall~~be~~ have ~~easy~~ access and be removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604 .

Commenter's Reason: The Plumbing committee felt that this was an appropriate change, but did not like the word ‘easy’ in Section 1302.9 as this is not uniformly enforceable. The BCAC used the word only because the original language was ‘easily accessible’. However, we agree with the committee and are proposing to delete that word. We ask the membership to approve this proposal with that revision.
This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 as well at G1-21 Parts 2, 3, 5 and 6.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal continues the committee work to remove ‘accessible’ where the context is not about accessibility for persons with disabilities. The defined terms ‘access to’ and ‘ready access’ is used where appropriate. The modifications were to address concerns expressed during

the testimony and expressed by the Egress committee.

Final Hearing Results

G1-21 Part IV AMPC1

G1-21 Part V

Original Proposal

PART V - IMC: 306.1, 506.3.2.2; IFGC: [M]306.1; ICCPC: SECTION 202 (New)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

306.1 Access. *Appliances*, controls devices, heat exchangers and HVAC system components that utilize energy shall~~be accessible~~ provide access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*.

506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, ~~accessible~~ available for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:
   1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from the plane of the opening.

   1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch (25 mm) above the bottom end of the duct.

   1.3. A gasket rated for use at not less than 1,500ºF (816ºC) is installed between the duct flange and the top of the hood.

   1.4. The duct-to-hood joint shall be secured by stud bolts not less than $^1/_4$ inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. The bolts and nuts shall be secured with lockwashers.

2. *Listed* and *labeled* duct-to-hood collar connections installed in accordance with Section 304.1.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action ***As Submitted***

Committee Reason: The proposal was approved as submitted because it provides coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities, the proposal deletes the word accessible from the code and replaces it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes. (Vote: 11-0)

Final Hearing Results

G1-21 Part V AS

G1-21 Part VI

Original Proposal

PART VI - ISPSC: [A]110.1, SECTION 202, SECTION 202 (New), 303.1.1, 306.9, 313.4, 314.5, 324.2, 409.4.3, 504.1, 603.2, 612.5.1, 704.7.3, 704.7.2, 1001.6

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Swimming Pool and Spa Code

Add new definition as follows:

ACCESS (TO).

.
That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also Ready access (to)].

Delete without substitution:

~~**ACCESSIBLE.** Signifies access that requires the removal of an access panel or similar removable obstruction~~.

Add new definition as follows:

READY ACCESS (TO).

.
That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see Access (to)].

Revise as follows:

[A] 110.1 General. Construction or work for which a permit is required shall be subject to inspection by the *code official* and such construction or work shall remain visible and able to be accessed for inspection purposes until *approved*. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the permit applicant to cause the work to remain ~~accessible~~ available and exposed for inspection purposes. Neither the *code official* nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

303.1.1 Heaters. The electric power to heaters shall be controlled by ~~a readily accessible~~ an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

306.9 Valves under decks. Valves installed in or under decks shall be ~~accessible~~ provided access or operation, service, and maintenance. Where access through the deck walking surface is required, an access cover shall be provided for the opening in the deck. Such access covers shall be slip resistant and secured.

313.4 Location. Provide access to pumps ~~Pumps~~ and motors ~~shall be accessible~~ for inspection and service in accordance with the manufacturer's specifications.

314.5 Vacuum fittings. Where installed, provide access to *submerged vacuum fittings* ~~shall be accessible~~ and such fittings shall be located not greater than 12 inches (305 mm) below the water level.

324.2 Requirements. The equipment area or room floor shall be of concrete or other suitable material having a smooth slip-resistant finish and have positive drainage, including a sump drain pump, if necessary. Floors shall have a slope toward the floor drain or sump drain pump adequate to prevent standing water at all times. The opening to the equipment room or area shall be designed to provide access for all anticipated equipment. At least one hose bibb with backflow preventer shall be located in the equipment room or ~~be accessible~~ allow for access within an adequate distance of the equipment room so that a hose can service the entire room.

409.4.3 Emergency response units. Pools covered by this chapter shall be provided with first aid equipment, including a first aid kit. First aid equipment and kits shall be located in ~~an accessible location~~ to allow access.

504.1 Emergency shutoff switch. One emergency shutoff switch shall be provided to disconnect power to circulation and jet system pumps and air blowers. Provide access to emergency ~~Emergency~~ shutoff switches ~~shall be accessible~~ . Such switches shall be located within sight of the spa and shall be located not less than 5 feet (1524 mm) but not greater than 10 feet (3048 mm) horizontally from the inside walls of the spa.

603.2 Class D-2 pools. Where a Class D-2 pool has a bather ~~accessible~~ depth greater than 4$^1/_2$ feet (1372 mm), the floor shall have a distinctive marking at the 4$^1/_2$ feet (1372 mm) water depth.

612.5.1 Water collection and treatment tank. Interactive water play features shall drain to a collection and treatment tank. The inside of the tank shall ~~be accessible~~ provide access for cleaning and inspection. The access hatch or lid shall be locked or require a tool to open. The tank capacity shall be not less than 1000 gallons or ten times the number of gallons in a minute when all nozzles are operating simultaneously, whichever is greater. The volume water in the tank, at the design water level, shall not decrease more than 15% of that volume when all pumps and discharge piping fill with water to the discharge points of all nozzles.
Tanks shall be provided with a means to empty all water in the tank for the purposes of servicing or cleaning.

704.7.2 ~~Accessible~~ Access to pumps and motors. Pumps and motors shall be ~~accessible~~ provided access for inspection and service in accordance with the pump and motor manufacturer's instructions.

704.7.3 Pump shutoff valves. An ~~*accessible*~~ available means of ~~shut~~ shutting off ~~of~~ the suction and discharge piping for the pump shall be provided for maintenance and removal of the pump and be located with access.

1001.6 Access. Electrical components that require placement or servicing shall be ~~accessible~~ located with access.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

G1-21 Part VI AS

G2-22

Original Proposal

IBC: SECTION 202 (New)
Proponents: David Bonowitz, David Bonowitz, S.E., Self (dbonowitz@att.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Add new definition as follows:

LIFE SAFETY COMPONENTS (for risk category). Components of *life safety systems*, *designated seismic systems*, *emergency power systems*, and emergency and egress lighting systems. This definition of *life safety components* is limited in application to the provisions of Section 1604.5.

Reason:
This proposal defines a term already used in Section 1604.5.1. (If approved, the words "life safety components," currently used only in Sec 1604.5.1, would be italicized by staff.)

The term "life safety components" is similar to the term *life safety systems*, which was defined only in the 2021 IBC. But "life safety components" is also understood to include certain nonstructural components commonly considered "life safety systems" for purposes of seismic design, as cited in Section 1613 and as used without definition in ASCE 7. Those are identified by the IBC-defined term *designated seismic systems*.

Thus, a reasonable definition of *life safety components*, as already used in Section 1604.5.1 can be derived by combining these two groups of components. By adding *emergency power systems* (also already defined) and lighting, the proposed definition also draws from (and coordinates with) the scope of ASCE 41 (see below).

For reference:

ASCE 7 does not define "life safety systems," but for the design of protection for nonstructural components, Chapter 13 sets the component importance factor equal to 1.5 for any component "required to function for life-safety purposes after an earthquake, including fire protection sprinkler systems and egress stairways." The IBC term *designated seismic systems* covers these.

Similarly, ASCE 41 does not define "life safety systems," but its Tier 1 procedure includes a checklist section titled "Life Safety System," which includes the following items:

- Fire suppression piping: anchorage
- Flexible couplings (for fire suppression piping)
- Emergency power: anchorage of "equipment used to power or control Life Safety systems"
- Stair and smoke ducts
- Sprinkler ceiling clearance
- Emergency lighting (includes egress lighting)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely codifies the current understanding of a previously undefined term, using other terms already defined in the IBC.

Public Hearing Results

Committee Action **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Disapproved as the proposed definition could be construed as incomplete and it is recommended for BCAC review and coordination. (Vote: 12-2).

Public Comments

Public Comment 1

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

~~**LIFE SAFETY COMPONENTS (for risk category).** Components of *life safety systems*, *designated seismic systems*, *emergency power systems*, and emergency and egress lighting systems. This definition of *life safety components* is limited in application to the provisions of Section 1604.5.~~

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares ~~life safety components~~ *life safety systems, designated seismic systems, emergency power systems,* or emergency and egress lighting systems with another portion having a higher *risk category*, both portions shall be assigned to the higher *risk category*.

> **Exception:** Where a *storm shelter* designed and constructed in accordance with ICC 500 is provided in a building, structure or portion thereof normally occupied for other purposes, the *risk category* for the normal occupancy of the building shall apply unless the *storm shelter* is a designated emergency shelter in accordance with Table 1604.5.

Commenter's Reason: This comment takes a proposed definition that would only have applied to one code section, and instead makes it part of that section's text directly.
At the hearings, most of the opposition to G2 was about the new proposed definition relying almost entirely on other defined terms and not providing much new. There's nothing wrong with that (lots of IBC definitions use other defined terms), but if that's a concern, this comment resolves it. Similarly, any concern that a "system" would be defined as a type of "component" is also made moot by this comment.

The committee's reason for disapproval also reflects part of the direction we suggested at the hearings, namely that a BCAC effort is needed to resolve and coordinate various existing definitions and quasi-definitions, in the code and its referenced standards, related to "life safety components." While that would still be worthwhile, in the mean time it remains important to clarify what the term already used in Section 1604.5.1 intends. This public comment makes that clarification.

Finally, there might be some concern that by clarifying the current code language, we might be excluding some things that should be included, or including some things that should be excluded. But the vague, undefined *current* code language -- which would remain if G2 is disapproved -- presents the same problem. (Examples given at the hearings are interesting but should not justify disapproval. We don't know if alarms, gas detection systems, etc. were intended as *life safety components* when the phrase was first codified, but those should already be included in *life safety systems* because they "enhance or facilitate evacuation." We also don't know if partitions or doors used for smoke compartmentation were intended, but it stands to reason that they should be, and that they would be important to consider explicitly when designing a building with multiple connected wings.)

Our original proposal contemplated a Chapter 2 definition. Since similar terms are already used elsewhere in the code, ICC staff added the final sentence saying that the proposed definition would only apply in Section 1604.5. Once that caveat is added, however, there's no reason to put the definition in Chapter 2. Instead, per this public comment, we can just put the same idea right into the text of Section 1604.5.1, replacing the undefined term with more explicit wording, using terms already defined. Doing this avoids any concern about whether the definition might apply elsewhere, might "be construed as incomplete" because it merely uses other defined terms, or might interfere with other definitions.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
As with the original proposal, the public comment merely codifies the current understanding of an existing but undefined term, using other terms already defined in the IBC.

Final Hearing Results

G2-22	AMPC1

G3-21 Part I

Original Proposal

PART I - IBC: 1026.4.1 (IFC: 1026.4.1)
PART II - IFC: 805.2, 808.1
PART III - IPC: SECTION 202(New), 609.1
PART IV - IMC: SECTION 202(New)

Proponents: John Williams, Chair, Healthcare Committee (ahc@iccsafe.org)

THIS IS A 4 PART CODE CHANGE. PART I WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART IV WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

[BG] AMBULATORY CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than *24-hour basis* to persons who are rendered *incapable of self-preservation* by the services provided or staff has accepted responsibility for care recipients already incapable.

Revise as follows:

1026.4.1 Capacity. The capacity of the refuge area shall be computed based on a *net floor area* allowance of 3 square feet (0.2787 m^2) for each occupant to be accommodated therein. Where the *horizontal exit* also forms a *smoke compartment*, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and ~~Group B~~ ambulatory care facilities shall comply with Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 as applicable.

Reason: The term “ambulatory care facility” is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add ‘Group B’ in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where ‘Group B’ in not included. The intent is to not appear to have two different types of ‘ambulatory care facilities’.
There will also be a Group B proposal to IEBC to add the definition and correct the terms in 302.2.1, 503.15 and 805.11.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This an editorial clarification for consistent terminology

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as a good clarification. "Group B" in front of ambulatory care could be read to have two different types of ambulatory care facilities. It is clear that ambulatory care is included in Group B in Chapter 3. This provides consistency throughout the code. (Vote: 14-0)

Final Hearing Results

G3-21 Part I	AS

G3-21 Part II

Original Proposal

PART II - IFC: 805.2, 808.1

Proponents: John Williams, Chair, Healthcare Committee (ahc@iccsafe.org)

2021 International Fire Code

Revise as follows:

805.2 Group I-2 and ~~Group B~~ ambulatory care facilities. The requirements in Sections 805.2.1 through 805.2.2 shall apply to Group I-2 occupancies and ~~Group B~~ ambulatory care facilities.

808.1 Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies and~~Group B~~ ambulatory care facilities. Wastebaskets, linen containers and other waste containers, including their lids, located in Group I-1, I-2 and I-3 occupancies and~~Group B~~ ambulatory care facilities shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be *listed* in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509.1 of the International Building Code.

Exception: Recycling containers complying with Section 808.1.2 are not required to be stored in waste and linen collection rooms.

Reason: The term “ambulatory care facility” is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add ‘Group B’ in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where ‘Group B’ in not included. The intent is to not appear to have two different types of ‘ambulatory care facilities’.
There will also be a Group B proposal to IEBC to add the definition and correct the terms in 302.2.1, 503.15 and 805.11.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This an editorial clarification for consistent terminology

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal is an editorial clarification for consistent terminology and to be consistent with the actions taken on Parts I, III and IV. (Vote: 13-1)

Final Hearing Results

G3-21 Part II AS

G3-21 Part III

Original Proposal

PART III - IPC: SECTION 202(New), 609.1

Proponents: John Williams, Chair, Healthcare Committee (ahc@iccsafe.org)

2021 International Plumbing Code

Add new definition as follows:

<u>[BG] AMBULATORY CARE FACILITY</u>

.

<u>Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.</u>

Revise as follows:

609.1 Scope. This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to the requirements of this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment installed and maintained in the following *occupancies*: Group I-1, Group I- 2, ~~Group B~~ ambulatory care facilities, medical offices, research and testing laboratories, and Group F facilities manufacturing pharmaceutical drugs and medicines.

Reason: The term "ambulatory care facility" is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add 'Group B' in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where 'Group B' in not included. The intent is to not appear to have two different types of 'ambulatory care facilities'.
There will also be a Group B proposal to IEBC to add the definition and correct the terms in 302.2.1, 503.15 and 805.11.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This an editorial clarification for consistent terminology

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides for consistency with the building code. (13-1)

Final Hearing Results

G3-21 Part III AS

G3-21 Part IV

Original Proposal

PART IV - IMC: SECTION 202(New)

Proponents: John Williams, Chair, Healthcare Committee (ahc@iccsafe.org)

2021 International Mechanical Code

Add new definition as follows:

<u>[BG] AMBULATORY CARE FACILITY</u>

.

<u>Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.</u>

Reason: The term “ambulatory care facility” is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add ‘Group B’ in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where ‘Group B’ in not included. The intent is to not appear to have two different types of ‘ambulatory care facilities’.
There will also be a Group B proposal to IEBC to add the definition and correct the terms in 302.2.1, 503.15 and 805.11.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This an editorial clarification for consistent terminology

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal passed as submitted because it correlates with other i-codes. The term “ambulatory care facility” is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add ‘Group B’ in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where ‘Group B’ in not included. The intent is to not appear to have two different types of ‘ambulatory care facilities’. (Vote: 11-0)

Final Hearing Results

G3-21 Part IV AS

G5-22 Part I

Original Proposal

PART 1 - IBC: SECTION 202 (New); IFC: SECTION 202 (New)

PART 2 - IRC: SECTION 202 (New)

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhinternational.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

<u>TYPE X</u>

. <u>A type of gypsum panel product with special core additives to increase the fire resistance as specified by the applicable standards listed in Table 2506.2. (see the definition of 'Gypsum panel product')</u>

Reason: This clarifies the term already used in the code and harmonizes the terms and definitions to what is being used by ASTM and the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simply adding a definition for a term already used in the code.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted consistent with actions on G5-22 Part II. (Vote: 13-0)

Final Hearing Results

G5-22 Part I	AS

G5-22 Part II

Original Proposal

PART 1 - IBC: SECTION 202 (New); IFC: SECTION 202 (New)

PART 2 - IRC: SECTION 202 (New)

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhint.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE, PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Add new definition as follows:

TYPE X. A type of gypsum panel product with special core additives to increase the fire resistance as specified by the applicable standards specified in Section R702.3 and Part IX. (see the definition of 'Gypsum panel product')

Reason: This clarifies the term already used in the code and harmonizes the terms and definitions to what is being used by ASTM and the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simply adding a definition for a term already used in the code.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE INTERNATIONAL RESIDENTIAL BUILDING COMMITTEE.

Committee Reason: 'Type X' is a common industry term and is used several times in the code requirements. This would be consistent with the committee action on G1-22. (Vote: 9-1)

Final Hearing Results

G5-22 Part II	AS

G5-21

Original Proposal

IBC: SECTION 202, SECTION 202 (New)

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

Revise as follows:

[BG] CUSTODIAL CARE. Assistance with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living.
Custodial care includes persons receiving care who have the ability to respond to emergency situations and<u>may receive limited verbal or physical assistance. These care recipients may</u> evacuate at a slower rate and/or who have mental and psychiatric complications.

[BG] INCAPABLE OF SELF-PRESERVATION. Persons who, because of age, physical limitations, mental limitations, chemical dependency or medical treatment, cannot respond as an individual to an emergency situation.

Add new definition as follows:

<u>**LIMITED VERBAL OR PHYSICAL ASSISTANCE**</u>

.
<u>Persons who, because of age, physical limitations, cognitive limitations, treatment or chemical dependency, and may not independently recognize, respond or evacuate without limited verbal or physical assistance during an emergency situation. Verbal assistance includes prompting, giving and repeating instructions. Physical assistance includes assistance with transfers to walking aids or mobility devices and assistance with egress.</u>

Reason: The intent of this code change is to provide a new definition for Limited Verbal or Physical Assistance to correlate with the text of the existing document (Section 308.2.2 and 310.5.2) and provide needed clarity. This new definition describes a middle ground between able to evacuate independently and incapable of self-preservation. The I-1/R-4, Condition 2 occupancy group classification was added into the code, providing safeguards for care-recipients who, because of frailness, cognitive impairment or other conditions, need limited verbal or physical assistance with exiting the building. The intent, which was described in more detail in the Commentary, was to allow staff to assist care-recipients during evacuation, who may use mobility devices (walker or cane) or can self-propel in a wheelchair, with transferring out of bed, assist with balance while assistance with walking down stairs, or allow staff to physically assist care-recipients who do not use mobility devices to hold hands or arms, assist with balance, or provide other similar limited physical assistance. It also recognizes that people with dementia may need extra prompting or repeated instructions to complete the evacuation process. This definition is being added in response to some requests for clarity on what limited assistance means.
The Custodial Care definition is also being modified to better clarify and link that I-1/R-4 Occupancies, who receive Custodial Care, are able to receive Limited Verbal and Physical Assistance. The new "limited assistance" definition is also written to differentiate it from the current definition for Incapable of Self-Preservation. The Incapable of Self Preservation definition applies to occupants who "cannot respond as an individual to an emergency situation." This means they are not able to act independently or as an individual at all, during an emergency situation. Being unable to "respond as an individual" includes persons who may be mostly or completely incapacitated, semiconscious or unconscious, or who may be on life support. The new "limited assistance" definition purposely does not include these incapacitated persons. It instead limits helping individuals who can respond but may need , limited assistance with mobility and prompting.

The term 'limited verbal or physical assistance' is currently used in Group I-1, condition 2 (Section 308.2.2) and Group R-4, Condition 2 (Section 310.5.2).

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is clarifying a term currently used in the code. There are no technical changes for construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
[BG] CUSTODIAL CARE. Describes persons who receive assistance ~~Assistance~~ with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living. *Custodial care* includes persons receiving care who have the ability to respond to emergency situations and may receive *limited verbal or physical assistance*. These care recipients may evacuate at a slower rate and/or who have mental and psychiatric complications.

[BG] INCAPABLE OF SELF-PRESERVATION. Describes persons ~~Persons~~who, because of age, physical limitations, mental limitations, chemical dependency or medical treatment, cannot respond as an individual to an emergency situation.
LIMITED VERBAL OR PHYSICAL ASSISTANCE. Describes persons ~~Persons~~who, because of age, physical limitations, cognitive limitations, treatment or chemical dependency, and may not independently recognize, respond or evacuate without limited verbal or physical assistance during an emergency situation. Limited verbal ~~Verbal~~assistance includes prompting, giving and repeating instructions. Limited physical ~~Physical~~assistance includes assistance with transfers to walking aids or mobility devices and assistance with egress.

Committee Reason: The modification was approved as the three terms are describing a person's abilities. In the last two sentences of 'limited verbal or physical assistance', adding 'limited' uses specific terms throughout the definition. The proposal was approved as this definition is important to appropriately separate Condition 1 and 2 for Group I-1 in Section 308. (Vote: 11-3)

Final Hearing Results

G5-21 AM

G7-22

Original Proposal

IBC: [BS] 403.2.2, [BS] 403.2.2.1, [BS] 403.2.2.2, [BS] 403.2.2.3, [BS] 403.2.2.4

Proponents: Gabriel Quintana, Northwest Wall and Ceiling Bureau (NWCB), Northwest Wall and Ceiling Bureau (NWCB) (gabe@nwcb.org)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

[BS] 403.2.2 Structural integrity of interior exit stairways and elevator hoistway enclosures. For *high-rise buildings of Risk Category* III or IV in accordance with Section 1604.5, and for all buildings that are more than 420 feet (128 m) in *building height*, enclosures for *interior exit stairways* and elevator hoistway enclosures shall comply with Sections 403.2.2.1 through ~~403.2.2.4~~403.2.2.3.

Delete without substitution:

~~**[BS] 403.2.2.1 Wall assembly materials—soft body impact.** The panels making up the enclosures for *interior exit stairways* and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.~~

Revise as follows:

[BS] ~~403.2.2.2~~ 403.2.2.1 Wall assembly materials—~~hard body impact~~. ~~The panels making up the enclosures for *interior exit stairways* and elevator hoistway enclosures that are not exposed to the interior of the enclosures for *interior exit stairways* or elevator hoistway enclosure~~ Where an interior exit stairway enclosure or an elevator hoistway enclosure is constructed as an interior wall of the building, the panels applied to the exterior of the enclosure shall be in accordance with one of the following:

1. The wall assembly shall incorporate not fewer than two layers of impact-resistant panels, each of which meets or exceeds Soft Body Impact Classification Level 2 and Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.
2. The wall assembly shall incorporate not fewer than one layer of impact-resistant panels that meet or exceed Soft Body Impact Classification Level 2 and Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.
3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meets or exceeds Soft Body Impact Classification Level 2 and Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

[BS] ~~403.2.2.3~~ 403.2.2.2 Concrete and masonry walls. Concrete or masonry walls shall be deemed to satisfy the requirements of ~~Sections~~ Section 403.2.2.1 ~~and 403.2.2.2~~.

[BS] ~~403.2.2.4~~ 403.2.2.3 Other wall assemblies. Any other wall assembly that provides impact resistance equivalent to that required by Section~~s~~ 403.2.2.1 for Soft Body Impact Classification Level 2 and ~~403.2.2.2~~ for Hard Body Impact Classification Level 3, as measured by the test method described in ASTM C1629/C1629M, shall be permitted.

Reason: The code proposal reorganizes and clarifies the sections. It makes it much clearer that both soft and hard body criteria must be met in all cases. It also clarifies which walls/side of the enclosure are to have these materials.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a simple reorganization and clarification of language.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposal clarifies which walls/sides of the enclosure are to meet the criteria for structural integrity of enclosures. (Vote: 14-0)

Final Hearing Results

G7-22	AS

G8-21

Original Proposal

IBC: SECTION 202

Proponents: William Koffel, Koffel Associates, Inc., Fire Safe North America (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BF] FIRE PROTECTION RATING. The period of time that an opening protective<u>prevents or retards the passage of excessive flames</u>~~will maintain the ability~~ to confine a fire as determined by tests specified in Section 716. Ratings are stated in hours or minutes.

[BF] FIRE RESISTANCE. That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

Reason: The term “fire resistance” is used in the IBC to generically refer to certain fire properties of assemblies. The definition of “fire protection rating” does not specifically identify the properties associated with the ratings. The proposed language is intended to clarify the performance of an assembly that has a fire protection rating.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal simply clarifies an existing definition in the IBC and is not intended to result in any technical change to the requirements of the IBC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal is specific and improves the current definition. The proposal clarifies how the fire protection rating will be measured. The proposal makes the definition consistent with the testing standard terminology used in opening protective without changing the acceptance criteria. (Vote: 8-5)

Final Hearing Results

G8-21	AS

G8-22

Original Proposal

IBC: [BS] 403.2.2.3

Proponents: Thom Zaremba, Roetzel & Andress, National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, Roetzel & Andress, Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

[BS] 403.2.2.3 Concrete<u>,</u> ~~and~~ masonry <u>and glass</u> walls. Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2. <u>Glass walls complying with the safety glazing impact requirements of CPSC 16 CFR 1201, Cat. II or ANSI Z97.1, Class A shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2.</u>

Reason: The proposed change is needed to avoid costly, time consuming and unnecessary testing of glass walls that are already tested and marked as meeting the impact safety glazing standards set out in CPSC 16 CFR 1201, Cat II, or ANSI Z97.1, Class A. Testing glass walls to either safety glazing standard will subject them to impact testing at 400 ft. lbs. of force. The tests specified in Sections 403.2.2.1 and 403.2.2.2 only subject test specimens to 200 ft. lbs. of force. Obviously, glass walls that pass the 400 ft.lb. tests of either CPSC 16 CFR 1201 Cat. II or ANSI Z97.1 Class A, will also pass the tests specified in Sections 403.2.2.1 or 403.2.2.2. Accordingly, just as concrete and masonry walls are deemed to comply with Sections 403.2.2.1 and 403.2.2.2, so should glass walls that meet the "safety glazing" test standards set out in the proposal.

Cost Impact: The code change proposal will decrease the cost of construction
When glass walls complying with Cat. II or Class A safety glazing standards are "deemed" to comply with the less stringent test requirements of Sections 403.2.2.1 and/or 403.2.2.2, the costs of testing glass walls to Sections 403.2.2.1 or 403.2.2.2 will be unnecessary, thus, decreasing the cost of construction.

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Modification:
[BS]403.2.2.3 Concrete~~,~~ <u>and</u> masonry ~~and glass~~ walls. Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2.

<u>403.2.2.4 Glass walls.</u> Glass walls complying with the safety glazing impact requirements of CPSC 16 CFR 1201, Cat. II or ANSI Z97.1, Class A shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2.

Committee Reason: Approved as modified as the proposal adds the appropriate references for safety glazing impact requirements for glass walls. The modification simplifies the flow of the sections by dividing the single section into two sections. (Vote: 14-0)

Final Hearing Results

G8-22	AM

G9-22

Original Proposal

IBC: 3301.2, 3302.2, 3303.5, SECTION 3307, [BS] 3307.1; IEBC: [BG] 1501.2, [BG] 1501.4, SECTION 1502, [BS] 1502.1
Proponents: Justin M. Spivey, Wiss, Janney, Elstner Associates, Inc., Self (jspivey@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Revise as follows:

3301.2 Storage and placement. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or ~~adjoining~~adjacent property for the duration of the construction project.

3302.2 Manner of removal. Waste materials shall be removed in a manner that prevents injury or damage to persons, ~~adjoining~~adjacent properties and public rights-of-way.

3303.5 Water accumulation. Provision shall be made to prevent the accumulation of water or damage to any foundations on the premises or ~~the adjoining~~on adjacent property.

SECTION 3307
PROTECTION OF ~~ADJOINING~~ADJACENT PROPERTY

[BS] 3307.1 Protection required. ~~Adjoining~~Adjacent public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the *owners* of ~~adjoining~~adjacent buildings advising them that the excavation is to be made and that the ~~adjoining~~adjacent buildings should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

Reason: A distinction is needed between adjacent (Webster: close or near) and adjoining (Webster: touching or bounding at a point or line); adjoining is the more restrictive term as it requires contact. Especially in urban environments, *buildings* or non-building *structures* may separated by a public alley or otherwise close enough that demolition, excavation, or construction activities for one *building* or non-building *structure* may affect another without direct contact, i.e., adjacent but not adjoining. This and other related proposals being submitted in this cycle do not seek to address the numerous instances where adjacent and adjoining appear to be used interchangeably—most frequently in IBC Chapters 4, 7, 9, 10, and 23; instead, they seek to resolve inconsistent usage of adjacent and adjoining as a modifier of the words property, *structure*, *building*, and footing in IBC Chapters 18 and 33 and Appendix J and in IEBC Chapter 15.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not change the spirit of the provision, but changes the letter slightly. There is a chance the revised wording will curtail questionable or creative interpretations and thus increase initial cost, but to the extent it encourages proper protection of adjacent property, it will lower the risk of damage, reduce or eliminate the cost of repairs and/or litigation, and thereby decrease total cost.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposal adds consistency with the the scoping statement. The committee did express concerns on the interpretation of 'how far does adjacent extend'. The committee felt a clarification or definition could assist. (Vote: 9-5)

Final Hearing Results

G9-22	AS

G11-22

Original Proposal

IBC: [BS] 3307.1, [BS] 3307.2, [BS] 3307.2.2; IEBC: [BS] 1502.1, [BS] 1502.2, [BS] 1502.2.2

Proponents: Justin M. Spivey, Wiss, Janney, Elstner Associates, Inc., Self (jspivey@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

Revise as follows:

[BS] 3307.1 Protection required. Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the *owners* of adjoining ~~buildings~~<u>property</u> advising them that the excavation is to be made and that the adjoining ~~buildings~~<u>property</u> should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

[BS] 3307.2 Excavation retention systems. Where a retention system is used to provide support of an excavation for protection of adjacent <u>property or</u> *structures*, the system shall conform to the requirements in Sections 3307.2.1 through 3307.2.3.

[BS] 3307.2.2 Excavation retention system monitoring. The retention system design shall include requirements for monitoring of the system and adjacent <u>property or</u> *structures* for horizontal and vertical movement.

Reason: This proposal seeks to resolve inconsistent use of property, *structure*, and *building* in IBC Section 3307 and similar IEBC Section 1502. Property is not defined in Chapter 2 but assumed to indicate a parcel of real property (land) on which one or more *structures* might be located, and some or all of those *structures* might be *buildings* (per IBC and IEBC Chapter 2, *buildings* are *structures* "utilized or intended for supporting or sheltering any occupancy"). Given that property is the least restrictive term, and encompasses both *buildings* and non-building *structures* along with the parcel of land they occupy, the term property should be used throughout to improve consistency among subsections. IBC Section 3307 and IEBC Section 1502 already cover adjacent property; this proposal just makes all of these provisions consistent.

Cost Impact: The code change proposal will increase the cost of construction
This proposal resolves inconsistent use of terminology and is editorial only. Although there is a small chance that the revised wording would cause additional protective measures to be implemented and thus increase initial cost, the protective measures would presumably be designed to substantially limit or preclude damage to adjacent property, reducing or eliminating the cost of repairs and/or litigation, and thereby decreasing total cost.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposed language clarifies the intent of the code and provides protection of property. The committee did express concerns that generally the intent of the code is to protect adjoining buildings not adjoining landscaping. (Vote:

9-5)

Final Hearing Results

G11-22 AS

G12-22

Original Proposal

IBC: G109.1

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX G FLOOD-RESISTANT CONSTRUCTION

SECTION G109
MANUFACTURED HOMES

Revise as follows:

G109.1 Elevation. All new and replacement manufactured homes to be placed or substantially improved in a *flood hazard area* shall be elevated such that the top of the foundation for ~~lowest floor of~~ the manufactured home is ~~elevated to~~ at or above the *design flood elevation*.

Reason: As defined by the US Department of Housing and Urban Development, and IBC Appendix G, manufactured homes are built on permanent chassis and designed for use with or without a permanent foundation. Manufactured homes may be replaced from time to time. This code change applies the elevation requirement to the top of the foundation, rather than the floor of the home. This ensures that any future replacement home, regardless of the depth of the chassis and floor system, will be properly elevated. Note that when communities use the FEMA Flood Insurance Rate Maps to regulate flood hazard areas, the “design flood elevation” is equal to the “base flood elevation.”

The I-Codes require all other residential structures in flood hazard areas other than coastal high hazard areas (Zone V) and Coastal A Zones to have the lowest floors at or above the base flood elevation plus one foot, or the design flood elevation, whichever is higher (R322 or ASCE 24 Flood Design Class 2). In those flood hazard areas, this code change will achieve approximately the same result, depending on the depth of the chassis and floor system of individual homes. This is a reasonable way to equitably protect owners and occupants of manufactured homes. Also, Sec. R322.1.9 specifies the reference point for determining elevation is the bottom of the frame, which is essentially the same as the top of the foundation.

In coastal high hazard areas (Zone V) and Coastal A Zones, the I-Codes already require the “bottom of the lowest horizontal structural member of the lowest floor” to be at or above the base flood elevation plus one foot. In these flood hazard areas, this code change does not change that requirement because the top of the foundation is the same as the bottom of the chassis frame.

Ease of enforcement is an added benefit of this proposal because inspection of the foundation can determine compliance in advance of installation of a unit. Another benefit is when replacement units are installed on the same foundation there will be no need to factor in the depth of the chassis frame and floor system. For example, if the first installation has the walking surface of the floor at the required elevation but a replacement unit has a shallower frame/floor system, the foundation would have to be extended to make up the difference to ensure the walking surface of the replacement unit is at the required elevation.

Data on the relationship of elevation and damage by flooding that were compiled by FEMA and the US Army Corps of Engineers indicate that manufactured homes, on average, sustain considerably more damage as a percent of structure value than do conventional construction.

Cost Impact: The code change proposal will increase the cost of construction
The code change will increase the cost of foundations for manufactured homes installed in flood hazard areas other than Zone V and Coastal A Zone because the foundations will be approximately 12 to 18 inches taller, which adds approximately $1500 to the foundation

cost. Most published information on the cost of adding additional height to foundations are developed based on total costs of conventional construction, not just the cost of the foundation. In 2018, Pinellas County, FL, collected cost estimates for the foundation and setting for a 28' x 70' unit. The County noted that in its jurisdiction, foundation piers that are 4 ft or taller must be designed by a registered professional engineer. The data indicate the cost of installation on a foundation that is 3 ft above grade was $8,500 and the cost for 4 ft above grade was $10,000. Assuming the installation or placement of the unit costs are the same, the cost to add one foot to the foundation is $1,500. It is reasonable to assume that the cost for an additional foot of foundation height is approximately the same, regardless of how tall the piers must be to meet the current requirement.

Analyses of flood damage as a function of elevation have been prepared by FEMA and the U.S. Army Corps of Engineers. The analyses show that adding just one additional foot of elevation results in significant damage avoided if floodwater rises higher than the floor. Having the top of the foundation at the base flood elevation means the floor will be at least one foot higher, which can avoid damage estimated to be between 10-40% of the unit value. Avoiding damage saves the unit owner in the long run. Also, flood insurance policies written by the National Flood Insurance Program may be reduced because the rating is based, in part, on the elevation of the top of the lowest floor.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposal will appropriately assist in mitigating damage due to flood. (Vote: 14-0)

Final Hearing Results

G12-22 AS

G13-22

Original Proposal

IBC: G112.1

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX G FLOOD-RESISTANT CONSTRUCTION

SECTION G112
OTHER BUILDING WORK

Revise as follows:

G112.1 Garages and accessory structures. Garages and accessory structures shall be designed and constructed in accordance with ASCE 24~~.~~, subject to the limitations of this section:

1. In flood hazard areas other than coastal high hazard areas and Coastal A Zones, the floors of detached garages and detached accessory storage structures are permitted below the elevations specified in ASCE 24 provided such structures are used solely for parking or storage, are one story and not larger than 600 square feet (55.75 m^2).
2. In coastal high hazard areas and Coastal A Zones, the floors of detached garages and detached accessory storage structures are permitted below the elevations specified in ASCE 24 provided such structures are used solely for parking or storage, are one story and are not larger than 100 square feet (9.29 m^2). Such structures shall not be required to have breakaway walls or flood openings.

Reason: The regulations of the National Flood Insurance Program require all structures to be elevated or dry floodproofed (nonresidential only). FEMA guidance issued in 1993 (NFIP Technical Bulletin 7) states that communities must use variances to authorize non-elevated detached accessory structures that are wet floodproofed. Wet floodproofing measures minimize flood damage by allowing certain areas to flood, relieving hydrostatic loads and using materials resistant to flood damage. FEMA expects to reissue Technical Bulletin 7 in early 2022. In 2020, FEMA issued a policy and bulletin specifying requirements for communities to issue permits for non-elevated, wet floodproofed accessory structures rather than variances. Notably, the policy and bulletin establish size limits as a function of flood zone. In flood hazard areas identified as Zone A (all zones that start with "A"), the size limit is one-story two car garage (600 sq ft) and in areas identified as Zone V (start with "V"), the size limit is 100 sq ft. Detached accessory structures that are larger than these sizes must fully comply with the elevation or dry floodproofing requirements for buildings in flood hazard areas. Alternatively, communities may consider individual variances for those larger accessory structures (local floodplain management regulations have criteria for considering variances).

The proposal amends Section G112.1 in IBC Appendix G, Flood-Resistant Construction, to specify size limits applicable when the provisions of ASCE 24 are used to allow wet floodproofed accessory storage structures and detached garages in flood hazard areas. Note that enclosures under elevated buildings used solely for parking, storage and building access are enclosures, not garages.

The size limits specified by FEMA are:

· In flood hazard areas other than coastal high hazard areas, one-story and not larger than 600 sq ft (approximately a two-car garage). FEMA expects communities to require elevation or dry floodproofing if the structures are larger, or approve them by variance.

· In coastal high hazard areas (Zone V), not larger than 100 sq ft. Note that breakaway walls and flood openings, which are required by ASCE 24, are not required (not required by the FEMA policy). FEMA expects communities to require elevation if the structures are larger, or approve them by variance.

Bibliography: The Floodplain Management Agricultural Structures Policy and FEMA P-2140*, Floodplain Management Bulletin: Requirements for Agricultural Structures and Accessory Structures*, are available here:https://www.fema.gov/media-collection/floodplain-management-requirements-agricultural-and-accessory-structures

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal limits the size of detached accessory structures and detached garages that can be wet floodproofed. There will be a reduction in costs for accessory structures in Zone V because ASCE 24 requires breakaway walls and flood openings, but the FEMA policy does not specify breakaway walls or flood openings. For 100 sq ft structures (10 x 10) there will be a cost decrease by avoiding the installation of at least two flood openings. Engineered flood opening devices cost approximately $100-$150 each, not including the cost of installation (nonengineered openings, such as typical air vent device disabled in the open position, cost less). Cost data for fabrication of breakaway walls is not available. FEMA Technical Bulletin 9 contains prescriptive solutions for breakaway walls that do not require certification of design. A 10 x 10 structure has 100 linear feet of wall, thus cost savings are attributable to not having to fabricate approximately 100 feet of breakaway wall.An increase in costs occurs only when property owners want accessory structures or detached garages in flood hazard areas that are larger than the specified limits because those larger structures must be installed on elevated foundations (or dry floodproofed in Zone A/AE), unless approved by individually considered variances to be wet floodproofed. However, it is reasonable to assume that the large the size, the more costly would be the losses resulting from flooding. Therefore, there are avoided damage costs due to elevating or dry floodproofing (Zone A) and limiting size (Zone V). Additional costs for those larger structures to be elevated depend on the type of foundation chosen. In the report “Natural Hazard Mitigation Saves,” the National Institute of Building Sciences estimates a cost of $33 per foot of elevation per pile and $325 per foot of elevation for stairs. Therefore, for a 1152 square foot accessory structure (24 ft by 48 ft) with 15 piles spaced 12 feet on center, the added cost of elevation would be $820 per foot of elevation. It is reasonable to assume the cost would be less when more typical pier foundation elements and anchoring are used.

Bibliography: Natural Hazard Mitigation Saves (2019), National Institute of Building Sciences.https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposed code provisions are based on FEMA guidance. The provisions appropriately specify size limits applicable when the provisions of ASCE 24 are utilized. (Vote: 14-0)

Final Hearing Results

G13-22 AS

G14-22

Original Proposal

IBC: H106.3 (New), TABLE H116.1
Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX H SIGNS

SECTION H106
ELECTRICAL

Add new text as follows:

H106.3 Listing. Electric signs shall be listed and labeled in accordance with UL 48, and shall be installed in accordance with the manufacturer's installation instructions.

Revise as follows:

TABLE H116.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM D635–14	*Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position*	H107.1.1
NFPA 70–20	*National Electrical Code*	H106.1, H106.2
NFPA 701–19	*Methods of Fire Test for Flame Propagation of Textiles and Films*	H106.1.1
UL 48-11	*Electric Signs, with revisions through March 2021*	H106.1

Reason: NFPA 70 Section 600.3 requires electric signs to be listed and labeled. This proposal clarifies that electric signs as an assembly are to be listed and labeled to UL 48, and to be installed in accordance with the manufacturers installation instructions. Electric signs covered by UL 48 include all signs (regardless of voltage) that are electrically operated and/or electrically illuminated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Electric signs are required by NFPA 70 to be listed and labeled. This clarifies the requirements for signs and therefore there is no additional cost.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted as the proposal provides appropriate guidance on listing of electric signs. (Vote: 14-0)

Final Hearing Results

G14-22 AS

G15-21

Original Proposal

IBC: SECTION 202

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

[BG] HIGH-RISE BUILDING. A building with an occupied floor<u>or occupied roof</u> located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Reason: The existing language refers to a floor that is more than 75 feet above the lowest level of fire department vehicle access. It is our opinion that an occupied roof is also a floor. A floor is something you walk on and people walk on an occupied floor. Therefore, we are proposing to provide clarifying language to include occupied roofs above 75 feet to classify the building as a high-rise building. The presence of occupants and combustible furnishings add to the difficulty of performing ground-based fire fighting. It also limits the ability of the firefighters to perform rescue operations from the ground. By classifying an occupied roof over 57 feet, additional safety provisions are required in the building.
This proposal will have an impact on the application of the Existing Building Code. If someone wants to convert an existing roof to an occupied roof and the roof is more than 75 feet above the lowest level of fire department vehicle access, the building will need to be upgraded to comply with the high rise building provisions in IBC Section 403. The addition of floor area would make the building less code complying that it was prior to constructing the occupied roof.

Cost Impact: The code change proposal will increase the cost of construction
If a jurisdiction did not previously classify an occupied roof as a floor, the increased safety requirements for high-rise buildings will increase the cost of construction. However, if they are already looking at the occupied roof as an occupied floor, the cost of construction would not increase.

Staff note: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal to add 'occupied roofs' to the definition of 'highrise' was approved due to the concern that occupants on the occupied roof need to be protected with elements other than just being open to the outside air. Fire department access to the roof is important for life safety. Concerns were raised that protection for occupied roofs were already addressed in other portions of the code, so having an occupied roof above the 75 foot height should not add the entire 'highrise' package of requirements - especially if the occupied roof was only a small portion of the overall roof. The proposal did not address the issue if a 'floor' is the floor of the story below the roof, a mezzanine in the top story, or what would be required for an occupied roof with elevated platforms on portions of the occupied roof. There was also a concern about the impact on existing building that wanted to add amenities on the roof. See also the Committee Action to G12, G14 and G16. (Vote: 10-4)

Final Hearing Results

G15-21 AS

G15-22

Original Proposal

IBC: J103.2, J104.2

Proponents: Justin M. Spivey, Wiss, Janney, Elstner Associates, Inc., Self (jspivey@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2021 International Building Code

APPENDIX J GRADING

SECTION J103
PERMITS REQUIRED

Revise as follows:

J103.2 Exemptions. A grading *permit* shall not be required for the following:

1. Grading in an isolated, self-contained area, provided that the public is not endangered and that such grading will not adversely affect ~~adjoining~~adjacent properties.
2. Excavation for construction of a *structure* permitted under this code.
3. Cemetery graves.
4. Refuse disposal sites controlled by other regulations.
5. Excavations for wells, or trenches for utilities.
6. Mining, quarrying, excavating, processing or stockpiling rock, sand, gravel, aggregate or clay controlled by other regulations, provided that such operations do not affect the lateral support of, or significantly increase stresses in, soil on ~~adjoining~~adjacent properties.
7. Exploratory excavations performed under the direction of a registered design professional.

Exemption from the *permit* requirements of this appendix shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

SECTION J104
PERMIT APPLICATION AND SUBMITTALS

Revise as follows:

J104.2 Site plan requirements. In addition to the provisions of Section 107, a grading plan shall show the existing grade and finished grade in contour intervals of sufficient clarity to indicate the nature and extent of the work and show in detail that it complies with the requirements of this code. The plans shall show the existing grade on ~~adjoining~~adjacent properties in sufficient detail to identify how grade changes will conform to the requirements of this code.

Reason: A distinction is needed between adjacent (Webster: close or near) and adjoining (Webster: touching or bounding at a point or line); adjoining is the more restrictive term as it requires contact. Especially in urban environments, *buildings* or non-building *structures* may separated by a public alley or otherwise close enough that demolition, excavation, or construction activities for one *building* or non-building *structure* may affect another without direct contact, i.e., adjacent but not adjoining. This and other related proposals being submitted in this cycle do not seek to address the numerous instances where adjacent and adjoining appear to be used interchangeably—most frequently in IBC Chapters 4, 7, 9, 10, and 23; instead, they seek to resolve inconsistent usage of adjacent and adjoining as a modifier of the words property, *structure*, *building*, and footing in IBC Chapters 18 and 33 and Appendix J and in IEBC Chapter 15.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not change the spirit of the provision, but changes the letter slightly. There is a chance the revised wording will curtail questionable or creative interpretations and thus increase initial cost, but to the extent it encourages proper protection of adjacent property, it will lower the risk of damage, reduce or eliminate the cost of repairs and/or litigation, and thereby decrease total cost.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved as submitted consistent with the committee action on G9-22. (Vote: 9-5)

Final Hearing Results

G15-22	AS

G17-21

Original Proposal

IBC: SECTION 202, 603.1, 722.5.1.3, 722.5.2.2, 722.5.2.3, [BF] 1705.16

Proponents: Bill McHugh, The McHugh Company, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BF]
INTUMESCENT FIRE-RESISTIVE ~~RESISTANT~~ MATERIALS ~~COATINGS~~

.
~~Thin film~~ ~~l~~Liquid mixture applied to substrates by brush, roller, spray or trowel which expands into a protective foamed layer to provide fire-resistive ~~resistant~~ protection of the substrates when exposed to flame or intense heat.

Delete without substitution:

~~**[BF] MASTIC FIRE-RESISTANT COATINGS.** Liquid mixture applied to a substrate by brush, roller, spray or trowel that provides fire-resistant protection of a substrate when exposed to flame or intense heat.~~

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in*shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*

   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

   1.3. Roof construction, including girders, trusses, framing and decking.

   Exceptions:

   1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
   2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A*roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

   1.4. Balconies, porches, decks and exterior*stairways* not used as required exits on buildings three*stories* or less above grade plane.

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent <u>fire-resistive materials</u> ~~and mastic resistant coatings~~, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

722.5.1.3 Sprayed fire-resistant materials. The *fire resistance* of wide-flange structural steel columns protected with sprayed fire-resistant materials, as illustrated in Figure 722.5.1(5), shall be permitted to be determined from the following expression:

$$R = [C_1(W/D) + C_2]h$$ **(Equation 7-13)**

where:

R = *Fire resistance* (minutes).

h = Thickness of sprayed fire-resistant material (inches).

D = Heated perimeter of the structural steel column (inches).

C_1 and C_2 = Material-dependent constants.

W = Weight of structural steel columns (pounds per linear foot).

The *fire resistance* of structural steel columns protected with intumescent fire-resistive materials ~~or mastic fire-resistant coatings~~ shall be determined on the basis of *fire-resistance* tests in accordance with Section 703.2.

722.5.2.2 Sprayed fire-resistant materials. The provisions in this section apply to structural steel beams and girders protected with sprayed fire-resistant materials. Larger or smaller beam and girder shapes shall be permitted to be substituted for beams specified in *approved* unrestrained or restrained fire-resistance-rated assemblies, provided that the thickness of the fire-resistant material is adjusted in accordance with the following expression:

$$h_2 = h_1 [(W_1 / D_1) + 0.60] / [(W_2 / D_2) + 0.60]$$ **(Equation 7-17)**

where:

h = Thickness of sprayed fire-resistant material in inches.

W = Weight of the structural steel beam or girder in pounds per linear foot.

D = Heated perimeter of the structural steel beam in inches.

Subscript 1 refers to the beam and fire-resistant material thickness in the *approved* assembly.
Subscript 2 refers to the substitute beam or girder and the required thickness of fire-resistant material.

The *fire resistance* of structural steel beams and girders protected with intumescent fire-resistive materials ~~or mastic fire-resistant coatings~~ shall be determined on the basis of fire-resistance tests in accordance with Section 703.2.

722.5.2.3 Structural steel trusses. The *fire resistance* of structural steel trusses protected with fire-resistant materials sprayed to each of the individual truss elements shall be permitted to be determined in accordance with this section. The thickness of the fire-resistant material shall be determined in accordance with Section 722.5.1.3. The weight-to-heated-perimeter ratio (*W/D*) of truss elements that can be simultaneously exposed to fire on all sides shall be determined on the same basis as columns, as specified in Section 722.5.1.1. The weight-to-heated-perimeter ratio (*W/D*) of truss elements that directly support floor or roof assembly shall be determined on the same basis as beams and girders, as specified in Section 722.5.2.1.
The *fire resistance* of structural steel trusses protected with intumescent fire-resistive materials ~~or mastic fire-resistant coatings~~ shall be determined on the basis of *fire resistance* tests in accordance with Section 703.2.

[BF] 1705.16 ~~Mastic and intumescent~~ Intumescent fire-~~resistant coatings~~ resistive materials. *Special inspections* and tests for ~~mastic and~~ *intumescent fire-*~~*resistant coatings*~~resistive materials applied to structural elements and decks shall be performed in accordance with AWCI 12-B. *Special inspections* and tests shall be based on the fire-resistance design as designated in the *approved construction documents*. *Special inspections* and tests shall be performed during construction. Additional visual inspection shall be performed after the rough installation and, where applicable, prior to the concealment of electrical, automatic sprinkler, mechanical and plumbing systems.

Reason: The purpose of this code proposal is consolidate two definitions for the same material into one term.
In researching for this code proposal, the IBC defines both terms, then uses a combined term - intumescent or mastic intumescent coatings - in the technical sections. That's why we are proposing the change to the definition. These materials purpose and usage is to provide fire-resistive protection. This new combined name and definition incorporates both the mastics and coatings, providing a place in the code for these products so it can be referred to as one name, and found in one definition. Finally, the Webster's Dictionary definition for 'resistive' is .... "marked by resistance - often used in combination // fire-*resistive* material." The term "Intumescent Fire-Resistive Materials" (IFRM) is also the term used for these products in the NFCA's Handbook of Accepted Fireproofing Knowledge and UL has changed their fire-resistance directory (UL Product iQ).

One note, we have deleted the words 'Thin Film'. While it is nice to have this in marketing literature, it is difficult to define thin and thick materials. The remaining 'liquid mixture', and 'applied by brush, roller, spray or trowel', do not limit thickness to thick or thin materials. The materials are Intumescent Fire-Resistive Materials meant for fireproofing, and the reason for this code change proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this is a definition change without technical requirements, it will not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: [BF] INTUMESCENT FIRE-RESISTIVE MATERIALS. Liquid mixture applied to substrates by brush, roller, spray or trowel which expands into a protective insulating ~~foamed~~ layer to provide fire-resistive protection of the substrates when exposed to flame or intense heat.

722.5.1.3 Sprayed fire-resistive ~~fire-resistant~~ materials. The *fire resistance* of wide-flange structural steel columns protected with sprayed fire-resistive ~~fire-resistant~~ materials, as illustrated in Figure 722.5.1(5), shall be permitted to be determined from the following expression:

$$R = [C_1 (W / D) + C_2]\ h \qquad \textbf{(Equation 7-13)}$$

where:

R = *Fire resistance* (minutes).

h = Thickness of sprayed fire-resistive ~~fire-resistant~~ material (inches).

D = Heated perimeter of the structural steel column (inches).

C_1 and C_2 = Material-dependent constants.

W = Weight of structural steel columns (pounds per linear foot).

The *fire resistance* of structural steel columns protected with intumescent fire-resistive materials shall be determined on the basis o*fire-resistance* tests in accordance with Section 703.2.

722.5.2.2 Sprayed fire-resistive ~~fire-resistant~~ materials. The provisions in this section apply to structural steel beams and girders protected with sprayed fire-resistive ~~fire-resistant~~ materials. Larger or smaller beam and girder shapes shall be permitted to be substituted for beams specified in *approved* unrestrained or restrained fire-resistance-rated assemblies, provided that the thickness of thefire-resistive ~~fire-resistant~~ material is adjusted in accordance with the following expression:

$$h_2 = h_1 [(W_1 / D_1) + 0.60] / [(W_2 / D_2) + 0.60] \qquad \textbf{(Equation 7-17)}$$

where:

h = Thickness of sprayed fire-resistive ~~fire-resistant~~ material in inches.

W = Weight of the structural steel beam or girder in pounds per linear foot.

D = Heated perimeter of the structural steel beam in inches.

Subscript 1 refers to the beam and fire-resistive ~~fire-resistant~~ material thickness in the *approved* assembly.

Subscript 2 refers to the substitute beam or girder and the required thickness offire-resistive ~~fire-resistant~~ material.

The *fire resistance* of structural steel beams and girders protected with intumescent fire-resistive materials shall be determined on the basis of fire-resistance tests in accordance with Section 703.2.

Committee Reason: The committee determined the modification uses "insulating" instead of "foamed", which is the proper word. The modification also clarifies the code and consistent with the latest code change using "fire-resistive" instead of "fire-resistant". The proposal is a good clarification and updates the code language with the proper industry terms. (Vote: 12-1)

Final Hearing Results

G17-21	AM

G20-21 Part I

Original Proposal

PART I - IBC: SECTION 202 (New), 302.1, 503.1.4, 503.1.4.1, 1004.7, 1006.1, 1006.3, 1006.3.1, 1006.3.2, 1006.3.3, 1006.3.4, 1009.2.1, 1011.12, 1011.12.2, 1011.14, 1011.15, 1011.16, 1019.3, 1104.4; (IFC[BE]1004.7, 1006.1, 1006.3, 1006.3.1, 1006.3.2, 1006.3.4, 1006.3.3, 1009.2.1, 1011.12, 1011.12.2, 1011.14, 1011.15, 1011.16, 1019.3, 1104.4)

PART II - IFC: SECTION 202 (New), 903.2.1.6 (IBC[F] 903.2.1.6)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

<u>OCCUPIABLE ROOF</u>

.
<u>An exterior space on a roof that is designed for human occupancy, other than maintenance, and which is equipped with a means of egress system meeting the requirements of this code.</u>

<u>New Subdefinition</u>.
<u>New Subdefinition</u>.

Revise as follows:

[BG] PENTHOUSE.
An enclosed,<u> unoccupiable</u> ~~unoccupied~~ rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, *stairways,* and vertical *shaft* openings.

302.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups specified in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. Structures containing multiple occupancy groups shall comply with Section 508 . Where a structure is proposed for a purpose that is not specified in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard.<u> Occupiable</u> ~~Occupied~~ roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with Section 503.1.4 .

1. Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5.
2. Business (see Section 304): Group B.
3. Educational (see Section 305): Group E.
4. Factory and Industrial (see Section 306): Groups F-1 and F-2.
5. High Hazard (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4.
7. Mercantile (see Section 309): Group M.

8. Residential (see Section 310): Groups R-1, R-2, R-3 and R-4.
9. Storage (see Section 311): Groups S-1 and S-2.
10. Utility and Miscellaneous (see Section 312): Group U.

503.1.4 Occupiable~~Occupied~~ roofs. A roof level or portion thereof shall be permitted to be used as an occupiable ~~occupied~~ roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the *story* immediately below the roof. The area of the occupiable ~~occupied~~ roofs shall not be included in the *building area* as regulated by Section 506. An occupiable ~~occupied~~ roof shall not be included in the *building height* or number of *stories* as regulated by Section 504, provided that the *penthouses* and other enclosed *rooftop structures* comply with Section 1511.

Exceptions:

1. The occupancy located on an occupiable ~~occupied~~ roof shall not be limited to the occupancies allowed on the *story* immediately below the roof where the building is equipped throughout with an *automatic sprinker system* in accordance with Section 903.3.1.1 or 903.3.1.2 and occupant notification in accordance with Sections 907.5.2.1 and 907.5.2.3 is provided in the area of the occupiable ~~occupied~~ roof. *Emergency voice/alarm communication* system notification per Section 907.5.2.2 shall also be provided in the area of the occupiable ~~occupied~~ roof where such system is required elsewhere in the building.
2. Assembly occupancies shall be permitted on roofs of open parking spaces of Type I or Type II construction, in accordance with the exception to Section 903.2.1.6.

503.1.4.1 Enclosures over occupiable ~~occupied~~ roof areas. Elements or structures enclosing the occupiable ~~occupied~~ roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupiable ~~occupied~~ roof.

Exception: *Penthouses* constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.

1004.7 Outdoor areas. *Yards*, patios, occupiable ~~occupied~~ roofs, *courts* and similar outdoor areas accessible to and usable by the building occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by persons in addition to the occupants of the building, and the path of egress travel from the outdoor areas passes through the building, *means of egress* requirements for the building shall be based on the sum of the *occupant loads* of the building plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual dwelling units of Group R-2.

1006.1 General. The number of *exits* or *exit access doorways* required within the *means of egress* system shall comply with the provisions of Section 1006.2 for spaces, including *mezzanines*, and Section 1006.3 for *stories* or occupiable ~~occupied~~ roofs.

1006.3 Egress from stories or occupiable ~~occupied~~ roofs. The *means of egress* system serving any *story* or occupiable ~~occupied~~ roof shall be provided with the number of separate and distinct *exits* or access to *exits* based on the aggregate *occupant load* served in accordance with this section.

1006.3.1 Occupant load. Where *stairways* serve more than one *story*, or more than one *story* and an occupiable ~~occupied~~ roof, only the *occupant load* of each *story* or occupiable ~~occupied~~ roof, considered individually, shall be used when calculating the required number of *exits* or access to *exits* serving that *story*.

1006.3.2 Path of egress travel. The path of egress travel to an *exit* shall not pass through more than one adjacent *story*.

Exception: The path of egress travel to an *exit* shall be permitted to pass through more than one adjacent *story* in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual dwelling unit, sleeping unit or live/work unit.
2. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility.

3. *Exit access stairways* and *ramps* within an *atrium* complying with Section 404.
4. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
5. *Exit access stairways* and *ramps* serving *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
6. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
7. Exterior *exit access stairways* and *ramps* between occupiable ~~occupied~~ roofs.

1006.3.3 Egress based on occupant load. Each *story* and occupiable ~~occupied~~ roof shall have the minimum number of separate and distinct *exits*, or access to *exits*, as specified in Table 1006.3.3. A single *exit* or access to a single *exit* shall be permitted in accordance with Section 1006.3.4. The required number of *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any *story* or occupiable ~~occupied~~ roof shall be maintained until arrival at the *exit discharge* or a *public way*.

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or occupiable ~~occupied~~ roof where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

1009.2.1 Elevators required. In buildings where a required accessible floor or occupiable ~~occupied~~ roof is four or more stories above or below a *level of exit discharge*, not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.

1011.12 Stairway to roof. In buildings four or more stories above grade plane, one *stairway* shall extend to the roof surface unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope).

Exception: Other than where required by Section 1011.12.1, in buildings without an occupiable ~~occupied~~ roof access to the roof from the top *story* shall be permitted to be by an *alternating tread device*, a ships ladder or a permanent ladder.

1011.12.2 Roof access. Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1511.2.

Exception: In buildings without an occupiable ~~occupied~~ roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable ~~unoccupied~~ roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

1011.15 Ship's ladders. Ship's ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m^2) with not more than three occupants and for access to unoccupiable ~~unoccupied~~ roofs. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm). Ship's ladders shall be designed for the live loads indicated in Section 1607.17.

1011.16 Ladders. Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be constructed in accordance with Section 306.5 of the International Mechanical Code and designed for the live loads indicated in Section 1607.17. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupiable ~~Nonoccupied~~ roofs that are not required to have *stairway* access in accordance with Section 1011.12.1.
6. Where permitted to access equipment and appliances in accordance with Section 306.5 of the International Mechanical Code.

1019.3 Occupancies other than Groups I-2 and I-3. In other than Group I-2 and I-3 occupancies, floor openings containing *exit access stairways* or *ramps* shall be enclosed with a shaft enclosure constructed in accordance with Section 713.

Exceptions:

1. *Exit access stairways* and *ramps* that serve or atmospherically communicate between only two adjacent stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.
4. *Exit access stairways* and *ramps* in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or *ramp* and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.
5. *Exit access stairways* and *ramps* within an *atrium* complying with the provisions of Section 404.
6. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
7. *Exit access stairways* and *ramps* serving smoke-protected or *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
8. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
9. Exterior *exit access stairways* or *ramps* between occupiable ~~occupied~~ roofs.

1104.4 Multistory buildings and facilities. At least one *accessible* route shall connect each accessible *story, mezzanine* and occupiable ~~occupied~~ roofs in multilevel buildings and *facilities*.

Exceptions:

1. An *accessible* route is not required to *stories, mezzanines* and occupiable ~~occupied~~ roofs that have an aggregate area of not more than 3,000 square feet (278.7 m^2) and are located above and below accessible levels. This exception shall not apply to:
   1.1. Multiple tenant facilities of Group M occupancies containing five or more tenant spaces used for the sales or rental of goods and where at least one such tenant space is located on a floor level above or below the accessible levels.

   1.2. *Stories* or *mezzanines* containing offices of health care providers (Group B or I).

   1.3. Passenger transportation facilities and airports (Group A-3 or B).

   1.4. Government buildings.

   1.5. Structures with four or more dwelling units.

2. *Stories*, *mezzanines* or occupiable ~~occupied~~ roofs that do not contain accessible elements or other spaces as determined by Section 1108 or 1109 are not required to be served by an accessible route from an *accessible* level.
3. In air traffic control towers, an *accessible route* is not required to serve the cab and the floor immediately below the cab.
4. Where a two-story building or facility has one *story* or *mezzanine* with an *occupant load* of five or fewer persons that does not contain *public use* space, that *story* or *mezzanine* shall not be required to be connected by an *accessible route* to the *story* above or below.

Reason: Over the last several cycles, code provisions have been added to address issues related to occupied/occupiable, vegetative and landscaped roofs. In some cases, the terms have been used interchangeably, in others applying to specific types of roof systems. With the increasing number of provisions, a definition is needed. A proposal last cycle (G7-19) attempted to add a definition for occupiable roof but was disapproved for several reasons including the fact it did not correlate with the fact the code uses “occupied roof” in some sections and “occupiable roof” in others.
This code proposal both adds a definition for “occupiable roof”and. changes terminology throughout the code to be consistent with use of “occupiable roof” rather than “occupied roof”. The definition is intended to parallel the existing code definition for occupiable space:

[BG] OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

The proposed definition is different in a few key ways: The laundry list of uses is left out, and the one clarification made that access for maintenance of rooftop mechanical equipment or other maintenance does not trigger assembly live load requirements or other provisions related to occupiable roofs. The references to light and ventilation are left out as occupiable roofs are exterior spaces. No mechanical ventilation is necessary, and the code does not require lighting for exterior spaces other than portions of the means of egress.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is purely editorial and does not affect how occupiable roofs are designed or constructed.

Staff Note: G20-21, G21-21 and G22-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

Committee Reason: The modification added 'repair' to the definition, which is consistent with other sections in the codes related to roof requirements. The definition was approved because it clarifies a 'occupiable roof' is for roofs for human occupancy on a regular basis. The term was also coordinated throughout the code. (Vote: 12-2)

Final Hearing Results

G20-21 Part I	AM

G20-21 Part II

Original Proposal

PART II - IFC: SECTION 202 (New), 903.2.1.6 (IBC[F] 903.2.1.6)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new definition as follows:

OCCUPIABLE ROOF

.
An exterior space on a roof that is designed for human occupancy, other than maintenance, and which is equipped with a means of egress system meeting the requirements of this code.

Revise as follows:

903.2.1.6 Assembly occupancies on roofs. Where an ~~occupied~~ occupiable roof has an assembly occupancy with an*occupant load* exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the ~~occupied~~ occupiable roof and the *level of exit discharge* shall be equipped with an*automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: Open parking garages of Type I or Type II construction.

Reason: Over the last several cycles, code provisions have been added to address issues related to occupied/occupiable, vegetative and landscaped roofs. In some cases, the terms have been used interchangeably, in others applying to specific types of roof systems. With the increasing number of provisions, a definition is needed. A proposal last cycle (G7-19) attempted to add a definition for occupiable roof but was disapproved for several reasons including the fact it did not correlate with the fact the code uses “occupied roof” in some sections and “occupiable roof” in others.
This code proposal both adds a definition for “occupiable roof”and. changes terminology throughout the code to be consistent with use of “occupiable roof” rather than “occupied roof”. The definition is intended to parallel the existing code definition for occupiable space:

[BG] OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

The proposed definition is different in a few key ways: The laundry list of uses is left out, and the one clarification made that access for maintenance of rooftop mechanical equipment or other maintenance does not trigger assembly live load requirements or other provisions related to occupiable roofs. The references to light and ventilation are left out as occupiable roofs are exterior spaces. No mechanical ventilation is necessary, and the code does not require lighting for exterior spaces other than portions of the means of egress.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is purely editorial and does not affect how occupiable roofs are designed or constructed.

Staff Note: G20-21, G21-21 and G22-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance <u>or repair</u>, and which is equipped with a means of egress system meeting the requirements of this code.

Committee Reason: The committee stated that the reason for the approval of the modification was that the inclusion of the term repairs is important to the language of the definition. The reason for the approval of the proposal is that it provides a definition for a needed clarification of an occupiable roof. (Vote: 11-0)

Final Hearing Results

G20-21 Part II AM

G23-21

Original Proposal

IBC: SECTION 202 (New)

Proponents:
Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new definition as follows:

OVERHEAD DOOR STOP

.
Door hardware mounted at the top of the door and / or to the door frame which limits the opening of the door.

Reason: Proposal E41-18 revised the 2021 IBC to permit installation of overhead door stops where the overhead door stop encroaches into the door opening at the top of the opening. See the exception to 2021 IBC Section 1010.1.1.1. During review of the changes to the 2021 IBC, it was noted a definition (and picture) of an overhead door stop would be helpful with differentiating this door hardware item from the stop of the door frame at the top of the door opening. An "overhead door stop" is door hardware mounted at the top of a swinging door and / or to the door frame which limits opening of the door. Overhead door stops are an alternative to door stops screwed to the floor or to the wall. Most overhead door stops encroach slightly into the top of the doorway opening. Overhead door stops may also incorporate friction or damping to dampen the swinging of a door. An overhead door stop may have a "catch" to help hold the door in an open position.

Overhead door stop.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is not a change in requirements - just a definition for a term already used in the code.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: OVERHEAD DOOR STOP. Door hardware mounted at the top of the door and ~~/ or~~ to the door frame which limits s the swing of the door in the opening ~~of the door~~.

Committee Reason: The modification was approved as this clarified an overhead door stop limits the swing instead of holding the door shut like a closer. This coordinates E41-18 and Section 1010.1.1.1. This fixes a conflict between clear opening and door opening. (Vote: 14-0)

Final Hearing Results

G23-21	AM

G29-21

Original Proposal

IBC: SECTION 202, 403.2.3, 412.2.1.3, 603.1, 704.13, FIGURE 722.5.1(5), 722.5.1.1, 722.5.1.3, 722.5.1.3.2, 722.5.2.2, [BF] 1705.15, [BF] 1705.15.2, [BF] 1705.15.4, [BF] 1705.15.4.1, [BF] 1705.15.4.2, [BF] 1705.15.4.5, [BF] 1705.15.5, [BF] 1705.15.6, [BF] 1705.15.6.1, [BF] 1705.15.6.2, [BF] 1705.15.6.3

Proponents: Bill McHugh, The McHugh Company, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BF]
SPRAYED FIRE-<u>RESISTIVE</u> ~~RESISTANT~~ MATERIALS

. Cementitious or fibrous materials that are sprayed to provide fire-resistant protection of the substrates.

403.2.3 Sprayed fire-<u>resistive</u> ~~resistant~~ materials (SFRM). The bond strength of the SFRM installed throughout the building shall be in accordance with Table 403.2.3.

412.2.1.3 Sprayed fire-<u>resistive</u> ~~resistant~~ materials (SFRM). The bond strength of the SFRM installed in airport traffic control towers shall be in accordance with Section 403.2.3 where the control cab is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   - 1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in*shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*
   - 1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.
   - 1.3. Roof construction, including girders, trusses, framing and decking.

     Exceptions:

     1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
     2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A*roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.
   - 1.4. Balconies, porches, decks and exterior*stairways* not used as required exits on buildings three*stories* or less above grade plane.

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistive ~~resistant~~ materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

704.13 Sprayed fire-resistive ~~resistant~~ materials (SFRM). ~~Sprayed fire-resistant materials (SFRM)~~ SFRM shall comply with Sections 704.13.1 through 704.13.5.

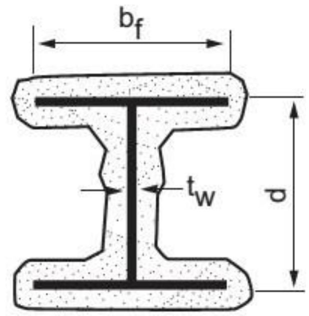


FIGURE 722.5.1(5) WIDE FLANGE STRUCTURAL STEEL COLUMNS WITH SPRAYED FIRE-RESISTIVE ~~RESISTANT~~ MATERIALS

722.5.1.1 General. These procedures establish a basis for determining the fire resistance of column assemblies as a function of the thickness of fire-resistant material and, the weight, W, and heated perimeter, D, of structural steel columns. As used in these sections, W is the average weight of a structural steel column in pounds per linear foot. The heated perimeter, D, is the inside perimeter of the fire-~~resistant~~ resistive material in inches as illustrated in Figure 722.5.1(1).

722.5.1.3 Sprayed fire-resistive ~~resistant~~ materials.(SFRM). The *fire resistance* of wide-flange structural steel columns protected with SFRM ~~sprayed fire resistant materials~~, as illustrated in Figure 722.5.1(5), shall be permitted to be determined from the following expression:

$$R = [C_1(W/D) + C_2]h \qquad \textbf{(Equation 7-13)}$$

where:

R = *Fire resistance* (minutes).

h = Thickness ofSFRM ~~sprayed fire-resistant material~~ (inches).

D = Heated perimeter of the structural steel column (inches).

C_1 and C_2 = Material-dependent constants.

W = Weight of structural steel columns (pounds per linear foot).

The *fire resistance* of structural steel columns protected with intumescent or mastic fire-resistant coatings shall be determined on the basis of *fire-resistance* tests in accordance with Section 703.2.

722.5.1.3.2 Identification. Sprayed fire-resistive ~~resistant~~ materials shall be identified by density and thickness required for a given*fire-resistance rating*.

722.5.2.2 Sprayed fire-resistive ~~resistant~~ materials (SFRM). The provisions in this section apply to structural steel beams and girders protected with (SFRM) ~~sprayed fire-resistantmaterials~~. Larger or smaller beam and girder shapes shall be permitted to be substituted for beams specified in *approved* unrestrained or restrained fire-resistance-rated assemblies, provided that the thickness of the~~fire-resistant~~ SFRM material is adjusted in accordance with the following expression:

$$h_2 = h_1 [(W_1 / D_1) + 0.60] / [(W_2 / D_2) + 0.60] \qquad \textbf{(Equation 7-17)}$$

where:

h = Thickness of~~sprayed fire-resistant~~ SFRM ~~material~~ in inches.

W = Weight of the structural steel beam or girder in pounds per linear foot.

D = Heated perimeter of the structural steel beam in inches.

Subscript 1 refers to the beam and ~~fire-resistant material~~ SFRM thickness in the *approved* assembly.

Subscript 2 refers to the substitute beam or girder and the required thickness ofSFRM~~fire-resistant materia~~l.

The *fire resistance* of structural steel beams and girders protected with intumescent or mastic fire-resistant coatings shall be determined on the basis of fire-resistance tests in accordance with Section 703.2.

[BF] 1705.15 Sprayed fire-resistive ~~resistant~~ materials (SFRM). *Special inspections* and tests of SFRM ~~sprayed fire-resistant materials~~ applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6. *Special inspections* shall be based on the fire-resistance design as designated in the*approved construction documents*. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed during construction with an additional visual inspection after the rough installation of electrical, automatic sprinkler, mechanical and plumbing systems and suspension systems for ceilings, and before concealment where applicable. The required sample size shall not exceed 110 percent of that specified by the referenced standards in Sections 1705.15.4.1 through 1705.15.4.9.

[BF] 1705.15.2 Structural member surface conditions. The surfaces shall be prepared in accordance with the*approved* fire-resistance design and the written instructions of *approved* manufacturers. The prepared surface of structural members to be sprayed shall be inspected by the *special inspector* before the application of the SFRM ~~sprayed fire-resistant material~~.

[BF] 1705.15.4 Thickness. Not more than 10 percent of the thickness measurements of the ~~sprayed fire-resistant materials~~SFRM applied to floor, roof and wall assemblies and structural members shall be less than the thickness required by the *approved* fire-resistance design, and none shall be less than the minimum allowable thickness required by Section 1705.15.4.1.

[BF] 1705.15.4.1 Minimum allowable thickness. For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM E605. Samples of the SFRM ~~sprayed fire-resistant materials~~ shall be selected in accordance with Sections 1705.15.4.2 and 1705.15.4.3.

[BF] 1705.15.4.2 Floor, roof and wall assemblies. The thickness of the SFRM ~~sprayed fire-resistant material~~ applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E605, making not less than four measurements for each 1,000 square feet (93 m^2) of the sprayed area, or portion thereof, in each story.

[BF] 1705.15.4.5 Structural members. The thickness of the SFRM ~~sprayed fire-resistant material~~ applied to structural members shall be determined in accordance with ASTM E605. Thickness testing shall be performed on not less than 25 percent of the structural members on each floor.

[BF] 1705.15.5 Density. The density of the SFRM ~~sprayed fire-resistant material~~ shall be not less than the density specified in the *approved* fire-resistance design. Density of the ~~sprayed fire-resistant material~~ SFRM shall be determined in accordance with ASTM E605. The test samples for determining the density of the ~~sprayed fire-resistant materials~~ SFRM shall be selected as follows:

1. From each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) or portion thereof of the sprayed area in each story.
2. From beams, girders, trusses and columns at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m^2) of floor area or portion thereof in each*story*.

[BF] 1705.15.6 Bond strength. The cohesive/adhesive bond strength of the cured ~~sprayed fire-resistant material~~ SFRM applied to floor, roof and wall assemblies and structural members shall be not less than 150 pounds per square foot (psf) (7.18 kN/m^2). The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E736 by testing in-place samples of the ~~sprayed fire-resistant material~~SFRM selected in accordance with Sections 1705.15.6.1 through 1705.15.6.3.

[BF] 1705.15.6.1 Floor, roof and wall assemblies. The test samples for determining the cohesive/adhesive bond strength of the SFRM ~~sprayed fire-resistant materials~~ shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) of the sprayed area, or portion thereof, in each *story*.

[BF] 1705.15.6.2 Structural members. The test samples for determining the cohesive/adhesive bond strength of the SFRM ~~sprayed fire-resistant materials~~ shall be selected from beams, girders, trusses, columns and other structural members at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m^2) of floor area or portion thereof in each*story*.

[BF] 1705.15.6.3 Primer, paint and encapsulant bond tests. Bond tests to qualify a primer, paint or encapsulant shall be conducted where the SFRM ~~sprayed fire-resistant material~~ is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the ~~fire-resistant material~~ SFRM has not been determined. A bonding agent *approved* by the

SFRM manufacturer shall be applied to a primed, painted or encapsulated surface where the bond strengths are found to be less than required values.

Reason: The purpose of this proposal is to change the definition from Sprayed Fire-Resistant Matertials to Sprayed Fire-Resistive Materials (SFRM). The reason for the change is to align the IBC definition with the industry term for the products. The National Fireproofing Contractors Association's Handbook of Accepted Fireproofing Knowledge (HAFK) uses the term SFRM - Sprayed Fire-Resistive Materials. Secondly, the listing directories refer to "Fire-Resistive" rather than "Fire-Resistant" materials. Several IBC Chapter 7 sections use the term "Fire-Resistive", including fire-resistive glazing and door sections in the Opening Protectives Chapter. Finally, the abbreviations in Chapter 17 follow formatting for other sections (example; Exterior Insulation Finish System (EIFS).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this is a change in definition, it will not impact the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   - 1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*
   - 1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.
   - 1.3. Roof construction, including girders, trusses, framing and decking.

     Exceptions:
     1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
     2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A *roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.
   - 1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.
2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:
   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.
3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.

7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of*fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of*exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistive materials and intumescent and mastic <u>fire-resistive</u> ~~fire-resistant~~ coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

722.5.1.3 Sprayed fire-resistive materials.(SFRM). The *fire resistance* of wide-flange structural steel columns protected with SFRM , as illustrated in Figure 722.5.1(5), shall be permitted to be determined from the following expression:

$R = [C_1(W / D) + C_2]$ **(Equation 7-13)**
h

where:

R = *Fire resistance* (minutes).

h = Thickness ofSFRM (inches).

D = Heated perimeter of the structural steel column (inches).

C_1 and C_2 = Material-dependent constants.

W = Weight of structural steel columns (pounds per linear foot).

The *fire resistance* of structural steel columns protected with intumescent or mastic<u>fire-resistive</u> ~~fire-resistant~~ coatings shall be determined on the basis of *fire-resistance* tests in accordance with Section 703.2.

722.5.2.2 Sprayed fire-resistive materials (SFRM). The provisions in this section apply to structural steel beams and girders protected with (SFRM) . Larger or smaller beam and girder shapes shall be permitted to be substituted for beams specified in *approved* unrestrained or restrained fire-resistance-rated assemblies, provided that the thickness of the SFRM material is adjusted in accordance with the following expression:

$h_2 = h_1 [W_1 / D_1) + 0.60] / [(W_2 / D_2) + 0.60]$ **(Equation 7-17)**

where:

h = Thickness of SFRM in inches.

W = Weight of the structural steel beam or girder in pounds per linear foot.

D = Heated perimeter of the structural steel beam in inches.

Subscript 1 refers to the beam and SFRM thickness in the *approved* assembly.

Subscript 2 refers to the substitute beam or girder and the required thickness of SFRMI.

The *fire resistance* of structural steel beams and girders protected with intumescent or mastic<u>fire-resistive</u> ~~fire-resistant~~ coatings shall be determined on the basis of fire-resistance tests in accordance with Section 703.2.

Committee Reason: The committee concluded the modification fixes the main proposal text regarding using "fire-resistive" instead of "fire-resistant". Committee approval is in line with committee action on code change G 17-21. (Vote: 13-0)

Final Hearing Results

G29-21	AM

G32-21

Original Proposal

IBC: 304.1, 306.2, 311.2

Proponents: Robert Davidson, Davidson Code Concepts, LLC, Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Building Code

Revise as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

- Airport traffic control towers
- *Ambulatory care facilities*
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- *Clinic, outpatient*
- Dry cleaning and laundries: pick-up and delivery stations and self-service
- Educational occupancies for students above the 12th grade including *higher education laboratories*
- Electronic data processing
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m^2) in area
- Laboratories: testing and research
- <u>Lithium-ion or lithium metal battery testing, research and development</u>
- Motor vehicle showrooms
- Post offices
- Print shops
- Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
- Radio and television stations
- Telephone exchanges
- Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy)

306.2 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft (manufacturing, not to include repair)
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages: over 16-percent alcohol content
- Bicycles
- Boats
- Brooms or brushes
- Business machines

- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing
- Construction and agricultural machinery
- Disinfectants
- Dry cleaning and dyeing
- Electric generation plants
- Electronics
- Energy storage systems (ESS) in dedicated use buildings
- Energy storage systems (ESS) and equipment containing lithium-ion or lithium metal batteries
- Engines (including rebuilding)
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m^2) in area
- Furniture
- Hemp products
- Jute products
- Laundries
- Leather products
- Lithium-ion batteries
- Machinery
- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Vehicles powered by lithium-ion or lithium metal batteries
- Water/sewer treatment facilities
- Wood; distillation
- Woodworking (cabinet)

311.2 Moderate-hazard storage, Group S-1. Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

- *Aerosol products*, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over 16-percent alcohol content

- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lithium-ion or lithium Metal batteries
- Lumber
- Motor vehicle *repair garages* complying with the maximum allowable quantities of*hazardous materials* specified in Table 307.1(1) (see Section 406.8)
- Photo engravings
- Resilient flooring
- *Self-service storage facility* (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Vehicle repair garages for vehicles powered by lithium-ion or lithium metal batteries
- Wax candles

Reason: Over the last few cycles there have been a series of proposals dealing with energy storage systems that have highlighted the fire potential presented by lithium-ion and lithium metal batteries. Energy storage systems typically are installed in an occupancy with the proper protection and the occupancy of the building does not change. This is because the fire code provides for the appropriate safety levels for the installations. As part of the work done last cycle Energy Storage Systems in dedicated use buildings where there can be gigawatts of energy present was added to the F-1 Group. There are many other activities involving lithium-ion or lithium metal batteries that also belong in the appropriate Group but because they are not listed there is a problem in cases where the local code officials default to an unnecessary H Group designation.
This cycle, in addition to updating the ESS requirements there are proposals to address battery storage safety and to specify requirements for emergency action plans, suppression and detection for the B, F M and S Group activities. The activities are no different than others as far as Group designation when the appropriate level of protection exists. This proposal complements those activities by putting various activities involving lithium-ion or lithium metal batteries in the correct Group classification list. It should be noted that the largest lithium-ion battery, car manufacturing and ESS manufacturing facility currently in operation is designed with A, B, F-1 and S-1spaces by employing emergency action plans, suppression and detection.

The added activities are:

B Group: Lithium-ion or lithium metal battery testing, research and development

F-1 Group: Lithium-ion batteries; Vehicles powered by lithium-ion or lithium metal batteries

S-1 Group: Lithium-ion or lithium Metal batteries; Vehicle repair garages for vehicles powered by lithium-ion or lithium metal batteries

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The purpose is to place these occupancies in the proper groups, to that effect there is no impact on cost of construction. However, the reason for doing this is a tendency of local officials to default to an H Group designation creating significant increases in construction costs,

so this proposal would in many cases provide for a reduction in costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as this clarifies where to classify what Group energy storage systems shall be classified. This is consistent with similar systems with new technologies. (Vote: 8-6)

Final Hearing Results

G32-21	AS

G33-21

Original Proposal

IBC: 304.1, 1004.8 (IFC[BE] 1004.8)

Proponents: Greg Johnson, Johnson & Associates Consulting Services, Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, Codes and Standards International, Vertiv (peters.jay@me.com); Andrew Klein, A S Klein Engineering, Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, Target Corporation (barry.greive@target.com); David Collins, The Preview Group, Inc., The Preview Group, Inc. (dcollins@preview-group.com)

2021 International Building Code

Revise as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

- Airport traffic control towers
- *Ambulatory care facilities*
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- *Clinic, outpatient*
- Dry cleaning and laundries: pick-up and delivery stations and self-service
- Educational occupancies for students above the 12th grade including *higher education laboratories*
- Electronic data ~~processing~~ entry
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m^2) in area
- Laboratories: testing and research
- Motor vehicle showrooms
- Post offices
- Print shops
- Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
- Radio and television stations
- Telephone exchanges
- Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy)

1004.8 Concentrated business use areas. The *occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data entry ~~processing~~ centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where approved by the *building official*, the *occupant load* for concentrated business use areas shall be the actual *occupant load*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

Reason: Electronic data processing is proposed to be changed to electronic data entry to better align occupancy classifications with actual uses of space. Data entry is work performed in an office, potentially with dense occupant loads (See IBC Sec 1004.8 Concentrated Business Use). Data processing is an essentially automated work occurring in spaces with no occupant load other than information

technology maintenance personnel.
In other words, data entry is a business office function; data processing is an industrial process function.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change is a clarification with no additional costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because it adds clarification to the requirements between data processing and data entry use. (Vote: 12-1)

Final Hearing Results

G33-21	AS

G36-21

Original Proposal

IBC: [F]TABLE 307.1(1), [F]TABLE 307.1(2), [F]307.1.1, [F]TABLE 307.1.1 (New), [F]414.1, [F]415.1; IFC: 5001.1, TABLE 5001.1 (New), TABLE 5003.1.1(1), TABLE 5003.1.1(2)

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, j, m, n, ~~p~~]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	SeeNote q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fiber[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled[~~e~~]		(1,000)			(1,000)			(200)	
Combustible liquid[~~c, i~~]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, l]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000[d,e]	NA	NA	1,000[d,e]	NA	NA
	Liquefied			(150)[d,e]	NA		(150)[d,e]	NA		
Flammable liquid[~~c,~~o]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)[~~c,~~o]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[k]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE Solid pounds(cubic feet)	STORAGE Liquid gallons (pounds)	STORAGE Gas (cubic feet at NTP)	USE-CLOSED SYSTEMS Solid pounds(cubic feet)	USE-CLOSED SYSTEMS Liquid gallons (pounds)	USE-CLOSED SYSTEMS Gas (cubic feet at NTP)	USE-OPEN SYSTEMS Solid pounds(cubic feet)	USE-OPEN SYSTEMS Liquid gallons (pounds)
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d,e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d,e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 and Chapter 38 of the International Fire Code.
~~The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.~~

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

~~i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the International Fire Code~~.

j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

n. For ~~storage and display quantities~~ oxidizers, unstable (reactive) materials, and water reactive materials stored or displayed in Group M occupancies ~~and storage quantities~~ or stored in Group S occupancies, see section 414.2.5.1 ~~complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2)~~.

o. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2. ~~Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.~~

p. ~~The following shall not be included in determining the maximum allowable quantities~~:

~~1. Liquid or gaseous fuel in fuel tanks on vehicles~~.

~~2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the *International Fire Code*.~~

~~3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.~~

~~4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.~~

~~5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.~~

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

[F] TABLE 307.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, f, h, i]

MATERIAL	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
	Solid pounds[d, e, f]	Liquid gallons (pounds)[d, e, f]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	Gaseous 810[e] Liquefied (150)	5,000	500	Gaseous 810[e] Liquefied (150)	1,000	100
Highly Toxic	10	(10)	Gaseous 20[g] Liquefied (4)[g]	10	(10)	Gaseous 20[g] Liquefied (4)[g]	3	(3)
Toxic	500	(500)	Gaseous 810[e] Liquefied (150)[e]	500	(500)	Gaseous 810[e] Liquefied (150)[e]	125	(125)

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 and Chapter 38 of the International Fire Code.
~~In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.~~

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. For corrosive, highly toxic and toxic materials, stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.
~~For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).~~

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

[F] 307.1.1 Occupancy Exemptions~~Uses other than Group H.~~ Storage, use and handling of hazardous materials in accordance with Table 307.1.1 shall not be counted as contributing to Maximum Allowable Quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and handling shall comply with applicable provisions of the International Fire Code.~~An occupancy that stores, uses or handles *hazardous materials* as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.~~

1. ~~Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the *International Fire Code*.~~
2. ~~Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the *International Fire Code*.~~
3. ~~Closed piping system containing *flammable or combustible liquids* or gases utilized for the operation of machinery or equipment.~~
4. ~~Cleaning establishments that utilize *combustible liquid* solvents having a *flash point* of 140°F (60°C) or higher in closed systems employing equipment *listed* by an *approved* testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both.~~
5. ~~Cleaning establishments that utilize a liquid solvent having a *flash point* at or above 200°F (93°C).~~
6. ~~Liquor stores and distributors without bulk storage.~~
7. ~~Refrigeration systems.~~
8. ~~The storage or utilization of materials for agricultural purposes on the premises.~~
9. ~~Stationary storage battery systems installed in accordance with the *International Fire Code*.~~
10. ~~*Corrosive* personal or household products in their original packaging used in retail display.~~
11. ~~Commonly used *corrosive* building materials.~~
12. ~~Buildings and structures occupied for *aerosol product* storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1, provided that such buildings conform to the requirements of the *International Fire Code*.~~
13. ~~Display and storage of nonflammable solid and nonflammable or noncombustible liquid *hazardous materials* in quantities not exceeding the maximum allowable quantity per *control area* in Group M or S occupancies complying with Section 414.2.5.~~
14. ~~The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial *explosive* devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the *International Fire Code*.~~
15. ~~Stationary fuel cell power systems installed in accordance with the *International Fire Code*.~~
16. ~~Capacitor energy storage systems in accordance with the *International Fire Code*.~~
17. ~~Group B *higher education laboratory* occupancies complying with Section 428 and Chapter 38 of the International Fire Code.~~
18. ~~Distilling or brewing of beverages conforming to the requirements of the *International Fire Code*.~~
19. ~~The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of the *International Fire Code*.~~

Add new text as follows:

TABLE 307.1.1 HAZARDOUS MATERIAL EXEMPTIONS[a]

Material Classification	Occupancy or Application	Exemption
Combustible fiber	Baled Cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices are not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers are not limited
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for aerosol product storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited
	Fuel oil	The quantity of fuel oil storage complying with Section 603.3.2 of the International Fire Code is not limited
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply with Section 416
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilizated for agricultural purposes on the premises is not limited
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited
		The quantity of hazardous materials in stationary fuel cell power systems is not limited
		The quantity of hazardous materials in capacitor energy storage systems is not limited
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the*International Fire Code*.

Revise as follows:

[F] 414.1 General. ~~The provisions of Sections 414.1 through 414.6 shall apply to buildings~~ Buildings and structures occupied for the manufacturing, processing, dispensing, use or storage of *hazardous materials* shall comply with Sections 414.1 through 414.6.

Exception: Exemptions listed in Table 307.1.1 shall not be required to comply with Section 414.

[F] 415.1 General. Occupancies classified as Group H-1, H-2, H-3, H-4 and H-5 in accordance with Section 307shall comply with ~~The~~

~~provisions of~~ Sections 415.1 through 415.11~~ shall apply to the storage and use of hazardous materials in excess of the maximum allowable quantities per *control area* listed in Section 307.1~~.

Reason: This proposal attempts to clean up what has become a colossal mess of special exceptions to hazardous materials regulations and Group H occupancy classification and clarify that the special exceptions generally fall into two categories: 1) Outright exclusions to Group H with no quantity limit, or 2) Major increases of MAQ amounts beyond what is provided in the general application MAQ tables. The first group has appeared in a list of exceptions to Group H in IBC Section 307.1.1, and these materials/conditions were generally considered to be exempt from ever being Group H or having to comply with any of the general hazardous materials regulations in the IBC or IFC. The second group clearly gets its own MAQ allowances, but were not specifically exempted from having to follow general hazardous materials safety requirements that are otherwise applicable to quantities that do not exceed MAQ amounts.
Even in the original Group H requirements, and particularly footnotes to the MAQ tables, the "special conditions" were somewhat haphazardly organized, and the situation has only gotten worse over the past three-plus decades.

Trying to pull all of this information together into a more organized presentation was a massive undertaking and in some cases involved interpreting intent of provisions for which application wasn't 100-percent clearly conveyed by existing text. Being involved in this topic for more than 30 years, I feel reasonably confident that my understanding of how the provisions apply is accurate, and certainly, there was no intent to deliberately gore someone's ox. My advice to anyone who is impacted by these portions of the codes is to read the rewrite closely to make sure that there were no unintended consequences from the work that was done. Given the scope of this project and less 3rd party review of the proposal prior to submittal than I would have preferred, it is certainly possible that mistakes may have been made, and in such cases, I will be happy to work on a floor modification for committee consideration to fix these. Note that, for the new Table 307.1.1 and the companion IFC table, I included an extra column showing the original source location for each row/exemption to assist reviewers. It is intended that this information will not be carried into the final version that appears in the code, but may be useful for staff to retain for inclusion in the commentary books

TABLE 307.1.1

HAZARDOUS MATERIAL EXEMPTIONS[a]

Material Classification	Occupancy or Application	Exemption	2021 Source (column to be deleted prior to publication)
Combustible fiber	Baled Cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115	Table 307.1(1) note "o"
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited	Section 307.1.1 Item 11
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging	Section 307.1.1 Item 10
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	Table 307.1(2) note "c"
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices are not limited	Section 307.1.1 Item 14
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers are not limited	Section 307.1.1 Item 14
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for aerosol product storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1	Section 307.1.1 Item 12
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited	Section 307.1.1 Item 6
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited	Section 307.1.1 Item 18
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited	Section 307.1.1 Item 19
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons	Table 307.1(1) note "c"

	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both	Section 307.1.1 Item 4
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited	Section 307.1.1 Item 5
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited	Section 307.1.1 Item 3
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited	Table 307.1(1) note "p" #1 & 2
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited	Table 307.1(1) note "p" #3
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited	Table 307.1(1) note "p" #4
	Fuel oil	The quantity of fuel oil storage complying with Section 603.3.2 of the International Fire Code is not limited	Table 307.1(1) note "l"
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply with Section 416	Section 307.1.1 Item 1
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents	Table 307.1(1) note "p" #5
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	Table 307.1(1) note "c"
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-	Table 307.1(2) note "c"

		miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	
Any	Agricultural materials	The quantity of agricultural materials stored or utilizated for agricultural purposes on the premises is not limited	Section 307.1.1 Item 8
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited	Section 307.1.1 Item 9
		The quantity of hazardous materials in stationary fuel cell power systems is not limited	Section 307.1.1 Item 15
		The quantity of hazardous materials in capacitor energy storage systems is not limited	Section 307.1.1 Item 16
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code	Section 307.1.1 Item 7

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The revision is intended to be a reorganization and edit that should not affect the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 2021 International Building Code

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c j, m, n]

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Combustible liquid [o]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]

TABLE 307.1.1 HAZARDOUS MATERIAL EXEMPTIONS[a]

Portions of table not shown remain unchanged.

Material Classification	Occupancy or Application	Exemption
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices ~~is~~ are not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers ~~is~~ are not limited
Flammable and combustible liquids and gases	Fuel oil	The quantity of fuel oil storage complying with Section ~~605.4.2~~ 603.3.2 of the International Fire Code is not limited
Any	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code

2021 International Fire Code

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter. This chapter shall apply to all hazardous materials~~, other than those materials and conditions listed in Table 5001.1,~~ including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.
(balance unchanged)

TABLE 5003.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD [a, c, j, m, n, p]

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible fibers[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled[o]		(1,000)			(1,000)			(200)	
Combustible liquid[~~e~~o]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]

p.	Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

TABLE 5003.1.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, h, i, j]

Portions of table not shown remain unchanged.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 of the International Building Code and Chapter 38.

j. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

TABLE ~~5001.1~~ 5003.1.1(5) HAZARDOUS MATERIAL EXEMPTIONS[a]

Portions of table not shown remain unchanged.

Material Classification	Occupancy or Application	Exemption
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices ~~is~~ are not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers ~~is~~ are not limited
Flammable and combustible liquids and gases	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies, or both, constructed in accordance with Section 711, or boththe International Building Code
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 603.3.2 of the International Fire Code is not limited
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply withChapter 24Section 416
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1of the International Fire Code is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents
Any	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code

a. Exempted materials and conditions listed in this table are required to comply with~~applicable~~ provisions of ~~the *International Fire Code*~~ this code that are not based on exceeding maximum allowable quantities in Section 5003.

Committee Reason: This proposal clarifies and cleans up the group H occupancy exemptions and applicability of the hazardous materials provisions of the IFC. The new IBC Table 307.1.1 is a better and more comprehensive approach than the current list found in IBC Section 307.1.1. This proposal along with the F197-21 revising roof top storage are necessary fixes to better clarify the application of the hazardous materials requirements. The modifications further coordinate footnotes amongst the tables, clarifies references and fixes redundant text. Additionally, the proposed table explaining the exceptions to requirements for IFC Chapter 50 has been more appropriately placed within Section 5003 as Table 5003.1.1(5). Section 5003 is the more appropriate location as that is where the maximum allowable quantity (MAQ) information is found. Appropriate references were made in Tables 5003.1.1(1) and 5003.1.1(2) through footnotes. (Vote: 13-0)

Final Hearing Results

G36-21	AM

G40-21

Original Proposal

IBC: [F] 307.3.1
Proponents: William Koffel, Koffel Associates, Inc., Self (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[F] 307.3.1 Occupancies containing explosives not classified as H-1. The following occupancies containing *explosive* materials shall be classified as follows:

1. Division 1.3 *explosive* materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass *explosion* hazard shall be allowed in H-2 occupancies.
2. <u>Division 1.4 explosive materials that are used and maintained in a form that only pose a minor explosion hazard shall be allowed in H-3 occupancies.</u>

~~2~~<u>3.</u> Articles, including articles packaged for shipment, that are not regulated as a Division 1.4*explosive* under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in H-3 occupancies.

Reason: The FCAC Working Group 6.1 on Hazardous Materials discussed that Table 307.1(1) identified the occupancy for Division 1.4 explosive materials as Group H-3. However the language within Section 307.3 and the exceptions in Section 307.3.1 do not clearly link to that occupancy classification.
The IFC Commentary states that:
There are certain explosive materials that pose a hazard level less than that anticipated for a Group H-1 occupancy. A Group H-2 classification is permitted for Division 1.3 explosive materials used or maintained under conditions where the hazard level will not rise from that of a mass fire hazard to a mass explosion hazard. A Group H-3 occupancy classification is permitted for packaged and unpackaged articles not regulated as Division 1.4 explosives by the Bureau of Alcohol, Tobacco and Firearms, as well as unpackaged articles used in process operations, provided there is no concern regarding the propagation of a detonation or deflagration between the articles during process operations.

The proposed Item 2 is intended to correlate Table 307.1(1) with this section consistent with guidance provided in the IFC Commentary.

It should be noted that while Koffel Associates provides consulting services to the American Pyrotechnics Association, the proposal was not submitted on their behalf. The proposal was prepared based upon a commitment made to the Working Group to proposal a solution to the conflict.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Whereas the proposal clarifies the intent of the Code, there should be no impact on the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it appropriately correlates with the occupancy classifications for explosives. The language is consistent with the definition for 1.4 explosives but could be simplified to remove the duplicative language. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

[F] 307.3.1 Occupancies containing explosives not classified as H-1 . The following occupancies containing *explosive* materials shall be classified as follows:

1. Division 1.3 *explosive* materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass *explosion* hazard shall be allowed in H-2 occupancies.
2. Division 1.4 explosive materials ~~that are used and maintained in a form that only pose a minor explosion hazard~~shall be allowed in H-3 occupancies.
3. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4*explosive* under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in H-3 occupancies.

Commenter's Reason: The added text was not necessary since Division 1.4 explosives are always considered to be a minor explosion hazard, by definition. From IBC Chapter 2, Explosives 1.4 are "Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package." The added text suggests that Division 1.4 explosives might be used or maintained in such a way that they are not a minor explosion hazard, which does not appear to be possible for a material classified in 1.4.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Editorial clarification.

Final Hearing Results

G40-21	AMPC1

G41-21

Original Proposal

IBC: [F] 307.4, [F] 307.5
Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[F] 307.4 High-hazard Group H-2. Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa).
Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.
Cryogenic fluids, flammable.
<u>Category 1A</u>*Flammable gases.*
<u>Category 1B *Flammable gases* having a burning velocity greater than 3.9 inches per second (10 cm/s)</u>.
Organic peroxides, Class I.
Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103 kPa).
*Pyrophoric*liquids, solids and gases, nondetonable.
Unstable (reactive) materials, Class 3, nondetonable.
Water-reactive materials, Class 3.

[F] 307.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a*physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less
Combustible fibers, other than densely packed*baled cotton*, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or *explosion* hazard based on information prepared in accordance with Section 414.1.3
Consumer *fireworks*, 1.4G (Class C, Common)
Cryogenic fluids, oxidizing
<u>Category 1B *flammable gases* having a burning velocity of 3.9 inches per second (10 cm/s) or les</u>s
Flammable solids
Organic peroxides, Class II and III
Oxidizers, Class 2
Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less
Oxidizing gases
Unstable (reactive) materials, Class 2
Water-reactive materials, Class 2

Reason: This change coordinates the classification of high hazard with the change in definition to “flammable gas.” Category 1A flammable gases have an explosive component in that their deflagration index is extremely low. By comparison, Category 1B flammable gases with a burning velocity of 3.9 in/s or less have a very high deflagration index. Thus, there is a significant difference in the hazard level between the

two flammable gas categories.
The more appropriate classification for a Category 1B flammable gas with a burning velocity of 3.9 in/s or less appears to be Use Group H-3. This classification can be supported by a comparison of level of hazard identified in the code change to the MAQ table for flammable gas. The minimum ignition energy varies by as much at 58,000 times. The heat of combustion is between 6 and 19 percent of these Category 1B flammable gases. Thus, Use Group H-3 is the proper classification for Category 1B flammable gas with a burning velocity of 3.9 in/s or less.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will decrease the cost of construction
This code change reduces the cost of construction. By modifying the Use Group for Category 1B flammable gas, the construction costs are also lowered. The construction costs for Category 1A flammable gas remain unchanged, neither increased nor decreased in the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved based upon the actions taken on F3-21 and F192-21. (Vote: 14-0)

Final Hearing Results

G41-21 AS

G43-21

Original Proposal

IBC: 310.2, 310.3, 310.4, 310.4.2

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 310
RESIDENTIAL GROUP R

310.1 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* . Group R occupancies not constructed in accordance with the *International Residential Code* as permited by Sections 310.4.1 and 310.4.2 shall comply with Section 420.

Revise as follows:

310.2 Residential Group R-1. Residential Group R-1 occupancies containing *sleeping units* where the occupants are primarily *transient* in nature, including:

- *Boarding houses* (*transient*) with more than 10 occupants
- *Congregate living facilities* (*transient*) with more than 10 occupants
- Hotels (*transient*)
- Motels (*transient*)
- <u>Lodging houses with more than 5 guest rooms</u>

310.3 Residential Group R-2. Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

- Apartment houses
- *Congregate living facilities* (nontransient) with more than 16 occupants
  - *Boarding houses* (*nontransient*)
  - Convents
  - *Dormitories*
  - Fraternities and sororities
  - Monasteries
- Hotels (nontransient) <u>with more than 10 occupants</u>
- *Live/work units*
- Motels (nontransient) <u>with more than 10 occupants</u>
- Vacation timeshare properties

310.4 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

- Buildings that do not contain more than two *dwelling units*
- Care facilities that provide accommodations for five or fewer persons receiving care
- *Congregate living facilities* (nontransient) with 16 or fewer occupants
  - *Boarding houses* (nontransient)
  - Convents
  - *Dormitories*

- Fraternities and sororities
- Monasteries
- *Congregate living facilities* (*transient*) with 10 or fewer occupants
  - *Boarding houses* (*transient*)
- *Lodging houses* ~~(*transient*)~~ with five or fewer *guest rooms* ~~and 10 or fewer occupants~~
- <u>Hotels (nontransient) with 10 or fewer occupants</u>
- <u>Motels (nontransient) with 10 or fewer occupants</u>

310.4.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

Revise as follows:

310.4.2 Lodging houses. Owner-occupied *lodging houses* with five or fewer *guest rooms* ~~and 10 or fewer total occupants~~ shall be permitted to be constructed in accordance with the *International Residential Code,* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code.*

Reason: The intent of this proposal is to separate large and small lodging houses and non-transient hotel/motel.
The definition for lodging house does not limit the size of the facility. To be consistent with what can use the IRC, the text in IBC cannot use the standard occupant load limitations. In addition, 5 guest rooms and a proprietors family is most likely to be more than 10 occupants, which is currently in the IBC. In addition, the whole lodging house is not transient.

For small non-transient hotels and motels, the maximum occupant load of 10 is consistent with the current limitations for transient boarding houses.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of the divisions between large and small lodging houses and does not add any requirements for these facilities.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
310.3 Residential Group R-2. Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

- Apartment houses
- *Congregate living facilities* (nontransient) with more than 16 occupants
  - *Boarding houses* (*nontransient*)
  - Convents
  - *Dormitories*
  - Fraternities and sororities
  - Monasteries
- Hotels (nontransient) with more than ~~10 occupants~~ <u>five guest rooms</u>
- *Live/work units*
- Motels (nontransient) with more than ~~10 occupants~~ <u>five guest rooms</u>

- Vacation timeshare properties

310.4 Residential Group R-3

Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

- Buildings that do not contain more than two *dwelling units*
- Care facilities that provide accommodations for five or fewer persons receiving care
- *Congregate living facilities* (nontransient) with 16 or fewer occupants
    - *Boarding houses* (nontransient)
    - Convents
    - *Dormitories*
    - Fraternities and sororities
    - Monasteries
- *Congregate living facilities* (*transient*) with 10 or fewer occupants
    - *Boarding houses* (*transient*)
- *Lodging houses* with five or fewer *guest rooms*
- Hotels (nontransient) with ~~10 or fewer occupants~~ five or fewer guest rooms
- Motels (nontransient) with ~~10 or fewer occupants~~ five or fewer guest rooms

Committee Reason: The modification was approved because it proposed the 5 guestroom limitation for lodging houses with small hotels and motels - thus using consistent terminology. The proposal was approved because it coordinated the limits for lodging houses with small hotels and motels. (Vote: 13-1).

Final Hearing Results

G43-21	AM

G44-21 Part I

Original Proposal

PART I - IBC: 310.2, 420.2, 420.3, 716.2.6.1, 1010.1.2, 1103.2.11, E104.2.1; (IFC[BE] 1010.1.2)
PART II - IFC: 308.4.1, 403.9.1.1, 907.2.8.1, 907.2.8.2, 907.2.11.1, TABLE 907.5.2.3.2, 1103.7.5.1, 1103.7.5.1.1, 1103.7.5.2, 1103.7.5.2.1, 1104.5; (IBC[F] 907.2.8.1, 907.2.8.2, TABLE 907.5.2.3.2, 907.2.11.1); IPMC: [F] 704.6.1.1; IBC: [F] 403.4.7
PART III - IPC: TABLE 403.1, 606.2;
PART IV- IZC: SECTION 202, TABLE 801.2.1

Proponents: Daniel Willham, Fairfax County, Fairfax County (daniel.willham@fairfaxcounty.gov)

THIS IS A 4 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART IV WILL BE HEARD BY THE PROPERTY MAINTENANCE/ZONING CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

310.2 Residential Group R-1. Residential Group R-1 occupancies containing *sleeping units*or more than two *dwelling units* where the occupants are primarily *transient* in nature, including:

- *Boarding houses* (*transient*) with more than 10 occupants
- *Congregate living facilities* (*transient*) with more than 10 occupants
- Hotels (*transient*)
- Motels (*transient*)

420.2 Separation walls. Walls separating *dwelling units* in the same building, walls separating *sleeping units* in the same building, walls separating *dwelling units* from sleeping units in the same building, and walls separating *dwelling* or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *fire partitions* in accordance with Section 708.

420.3 Horizontal separation. Floor assemblies separating *dwelling units* in the same buildings, floor assemblies separating*sleeping units* in the same building, floor assemblies separating *dwelling units* from sleeping units in the same building, and floor assemblies separating dwelling or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as*horizontal assemblies* in accordance with Section 711.

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *dwelling units* or *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.

1010.1.2 Egress door types. Egress doors shall be of the side-hinged swinging door, pivoted door, or*balanced door* types.

Exceptions:

1. *Private garages*, office areas, factory and storage areas with an*occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.

4. Doors within or serving a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1010.3.1.
6. In other than Group H occupancies, special purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.3.3.
7. *Power-operated* doors in accordance with Section 1010.3.2.
8. Doors serving a bathroom within an individual *dwelling unit* or *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.

1103.2.11 Residential Group R-1. Buildings of Group R-1 containing not more than five *dwelling units* and *sleeping units* in aggregate for rent or hire that are also occupied as the residence of the proprietor are not required to comply with this chapter.

E104.2.1 Transient lodging. In *transient lodging* facilities, *dwelliing units* or *sleeping units* with accessible communication features shall be provided in accordance with Table E104.2.1. Units required to comply with Table E104.2.1 shall be dispersed among the various classes of units.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, "or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because it would address in the code requirements the extended stay hotels that include dwelling units, not just sleeping units. (Vote: 14-0)

Final Hearing Results

G44-21 Part I	AS

G44-21 Part II

Original Proposal

PART II - IFC: 308.4.1, 403.9.1.1, 907.2.8.1, 907.2.8.2, 907.2.11.1, TABLE 907.5.2.3.2, 1103.7.5.1, 1103.7.5.1.1, 1103.7.5.2, 1103.7.5.2.1, 1104.5; (IBC[F] 907.2.8.1, 907.2.8.2, TABLE 907.5.2.3.2, 907.2.11.1); IPMC: [F] 704.6.1.1; IBC: [F] 403.4.7

Proponents: Daniel Willham, Fairfax County, Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Building Code

Revise as follows:

[F] 403.4.7 Smoke removal. To facilitate smoke removal in post-fire salvage and overhaul operations, buildings and structures shall be equipped with natural or mechanical *ventilation* for removal of products of combustion in accordance with one of the following:

1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50-foot (15 240 mm) intervals. The area of operable windows or panels shall be not less than 40 square feet (3.7 m^2) per 50 linear feet (15 240 mm) of perimeter.

    Exceptions:

    1. In Group R-1 occupancies, each <u>*dwelling unit,*</u> *sleeping unit* or suite having an *exterior wall* shall be permitted to be provided with 2 square feet (0.19 m^2) of venting area in lieu of the area specified in Item 1.
    2. Windows shall be permitted to be fixed provided that glazing can be cleared by fire fighters.

2. Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.
3. Any other *approved* design that will produce equivalent results.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, "<u>or more than two</u> dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that it closes a gap in the requirements by including the proposed terms in various sections throughout the code. (Vote: 13-0)

Final Hearing Results

G44-21 Part II	AS

G44-21 Part III

Original Proposal

PART III - IPC: TABLE 403.1, 606.2;

Proponents: Daniel Willham, Fairfax County, Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
7	Residential	Hotels, motels, boarding houses (transient)	1 per *dwelling* or sleeping unit		1 per *dwelling* or sleeping unit		1 per *dwelling* or sleeping unit	–	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling or *sleeping* unit		1 per dwelling or *sleeping* unit		1 per dwelling or *sleeping* unit	–	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	–	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

606.2 Location of shutoff valves. Shutoff valves shall be installed in the following locations:

1. On the fixture supply to each plumbing fixture other than bathtubs and showers in one- and two-family residential *occupancies*, and other than in individual dwelling or sleeping units that are provided with unit shutoff valves in hotels, motels, boarding houses and similar *occupancies*.
2. On the water supply pipe to each sillcock.
3. On the water supply pipe to each appliance or mechanical equipment.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, "or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (14-0)

Final Hearing Results

G44-21 Part III	AS

G44-21 Part IV

Original Proposal

PART IV- IZC: SECTION 202, TABLE 801.2.1

Proponents: Daniel Willham, Fairfax County, Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Zoning Code

Revise as follows:

MOTEL, HOTEL.

Any building containing six or more *dwelling units* or *sleeping* units in aggregate intended or designed to be used, or that are used, rented or hired out to be occupied, or that are occupied for sleeping purposes by guests.

TABLE 801.2.1 OFF-STREET PARKING SCHEDULE

USE	NUMBER OF PARKING SPACES REQUIRED
Assembly	1 per 300 gross square feet
Dwelling unit	2 per dwelling unit
Health club	1 per 100 gross square feet
Hotel/motel	1 per dwelling or sleeping unit plus1 per 500 square feet of common area
Industry	1 per 500 square feet
Medical office	1 per 200 gross square feet
Office	1 per 300 gross square feet
Restaurant	1 per 100 gross square feet
Retail	1 per 200 gross square feet
School	1 per 3.5 seats in assembly rooms plus1 per faculty member
Warehouse	1 per 500 gross square feet

For SI: 1 square foot = 0.0929 m^2.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, "or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction This is a clarification and coordination of the code which will not affect construction cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that adding "dwelling unit" to the definition of hotel (R-1) and related table in the IZC, which like R-2 occupancies can also include both dwelling and sleeping units, appropriately correlated the requirements between I-codes. (Vote: 11-0)

Final Hearing Results

G44-21 Part IV	AS

G45-21

Original Proposal

IBC: 310.3, 310.4

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

310.3 Residential Group R-2. Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

- Apartment houses
- *Congregate living facilities* (nontransient) with more than 16 occupants
  - *Boarding houses* (*nontransient*)
  - Convents
  - *Dormitories*
  - Fire station living quarters
  - Fraternities and sororities
  - Monasteries
- Hotels (nontransient)
- *Live/work units*
- Motels (nontransient)
- Vacation timeshare properties

310.4 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

- Buildings that do not contain more than two *dwelling units*
- Care facilities that provide accommodations for five or fewer persons receiving care
- *Congregate living facilities* (nontransient) with 16 or fewer occupants
  - *Boarding houses* (nontransient)
  - Convents
  - *Dormitories*
  - Fire station living quarters
  - Fraternities and sororities
  - Monasteries
- *Congregate living facilities* (*transient*) with 10 or fewer occupants
  - *Boarding houses* (*transient*)
- *Lodging houses* (*transient*) with five or fewer *guest rooms* and 10 or fewer occupants

Reason: Fire stations are often mixed use facilities, and sometime include living quarters. There is the question if this is a single family residence, Group R-3, regardless of the number of fireman using the living quarters. This proposal will clarify how these spaces should be classified.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is a clarification of the correct classification for fire stations.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

310.3 Residential Group R-2.

Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

- Apartment houses
- *Congregate living facilities* (nontransient) with more than 16 occupants
    - *Boarding houses* (*nontransient*)
    - Convents
    - *Dormitories*
    - ~~Fire station~~ Emergency services living quarters
    - Fraternities and sororities
    - Monasteries
- Hotels (nontransient)
- *Live/work units*
- Motels (nontransient)
- Vacation timeshare properties

310.4 Residential Group R-3.

Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

- Buildings that do not contain more than two *dwelling units*
- Care facilities that provide accommodations for five or fewer persons receiving care
- *Congregate living facilities* (nontransient) with 16 or fewer occupants
    - *Boarding houses* (nontransient)
    - Convents
    - *Dormitories*
    - ~~Fire station~~ Emergency services living quarters
    - Fraternities and sororities
    - Monasteries
- *Congregate living facilities* (*transient*) with 10 or fewer occupants
    - *Boarding houses* (*transient*)
- *Lodging houses* (*transient*) with five or fewer *guest rooms* and 10 or fewer occupants

Committee Reason: The proposal was approved because it helps classify the living quarters for fire stations as Group R-2. Fire fighters are non-transient and familiar with the living arrangements. The modification was approved because it expanded this idea to include other emergency operation centers where staff may be sleeping. (Vote: 13-1)

Final Hearing Results

G45-21	AM

G46-21

Original Proposal

IBC: 310.4, 310.4.2

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

[BG] GUESTROOM. A room used or intended to be used by one or more guests for living or sleeping purposes.

[BG] LODGING HOUSE. A one-family dwelling where one or more occupants are primarily permanent in nature and rent is paid for guest rooms.

SECTION 310
RESIDENTIAL GROUP R

Revise as follows:

310.4 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

- Buildings that do not contain more than two *dwelling units*
- Care facilities that provide accommodations for five or fewer persons receiving care
- *Congregate living facilities* (nontransient) with 16 or fewer occupants
  - *Boarding houses* (nontransient)
  - Convents
  - *Dormitories*
  - Fraternities and sororities
  - Monasteries
- *Congregate living facilities* (*transient*) with 10 or fewer occupants
  - *Boarding houses* (*transient*)
- *Lodging houses* ~~(*transient*)~~ with five or fewer *guest rooms* ~~and 10 or fewer occupants~~

310.4.2 Lodging houses. Owner-occupied *lodging houses* with five or fewer *guest rooms* ~~and 10 or fewer total occupants~~ shall be permitted to be constructed in accordance with this code or the *International Residential Code*.~~, provided~~ Facilities constructed using the *International Residential Code* shall be protected by that an *automatic sprinkler system* ~~is~~ installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code.*

Reason: The intent of this change is to coordinate with IRC scoping for lodging houses. G40-12 added the defined term 'lodging house' and 'guestroom' and Section 310.4.2 for coordination with the scoping in the 2012 IRC. G40-15 added 'transient' and '10 or fewer occupants'. Since the owner or proprietor lives in the lodging house (see the definition), this is not 'transient', so that language should be deleted in Section 310.4. The reason given for adding "and 10 or fewer occupants" was consistency with the occupancy load for transient boarding houses. However, this does not take into consideration that owner's family as well as the 10 transient occupants. Occupant load is not addressed in the IRC, so this does not match the IRC Scoping in Section 101.2 Exception 2.

If the committee feels that 5 or fewer guestrooms is not a sufficient limitation, a maximum occupant load or either 10 transient occupants, or 16 total occupants could be considered.

The last change to Section 310.4.2 is to allow for a small bed-n-breakfast style hotel to be constructed in accordance with IBC if they so choose.

This is one of a group of proposals intended to coordinate the scoping items in IBC Section 101.2 and IRC 101.2. While the proposals work together, then also work separately. The proposal for coordination will be in Group B.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of requirements, not a change to construction requirements. Removal of the 10 occupant load from Lodging house, might allow for some small additional B-n-B facilities to be constructed under the IRC.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
310.4.2 Lodging houses. Owner-occupied *lodging houses* with five or fewer *guest rooms* shall be permitted to be constructed in accordance with this code or the *International Residential Code*~~.~~ , provided that facilities ~~Facilities~~ constructed using the *International Residential Code* shall be protected by that an *automatic sprinkler system* installed in accordance with ~~Section 903.3.1.3 or~~ Section P2904 of the *International Residential Code.*

Committee Reason: The modification was approved to make the lodging house sprinkler requirements consistent with the IRC requirements when a lodging house is permitted to be constructed under the IRC. The proposal was approved since it coordinates the 5 guest room threshold with IRC and provides and appropriate pointer that matches the IRC scoping. (Vote: 14-0)

Final Hearing Results

G46-21 AM

G48-21

Original Proposal

IBC: 311.2

Proponents: William Koffel, Koffel Associates, Inc., Household and Commercial Products Association (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

311.2 Moderate-hazard storage, Group S-1. Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

- *Aerosol products*, Levels 2 and 3<u>, aerosol cooking spray, plastic aerosol 3 (PA3)</u>
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over 16-percent alcohol content
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle *repair garages* complying with the maximum allowable quantities of*hazardous materials* specified in Table 307.1(1) (see Section 406.8)
- Photo engravings
- Resilient flooring
- *Self-service storage facility* (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

Reason: Adding aerosol cooking spray and plastic aerosols 3 (PA3) to the list for Group S-1 is consistent with the requirements in the International Fire Code and provides a more complete list. Without these being identified in the list, one is left to wonder what is the appropriate occupancy classification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding these to the list does not change how the IBC or IFC is applied to these storage facilities.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it correctly classifies these types of aerosal products. The package size and flamability is regulated. (Vote: 8-6)

Final Hearing Results

G48-21	AS

G52-21

Original Proposal

IBC: 402.8.5

Proponents: Alex Miear, Code Consultants, Inc. (CCI), Code Consultants, Inc. (CCI) (alexm@codeconsultants.com)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 402 COVERED MALL AND OPEN MALL BUILDINGS

Revise as follows:

402.8.5 Distance to exits. Within each individual tenant space in a *covered* or *open mall building*, the distance of travel from any point to an *exit* or entrance to the *mall* shall be not greater than 200 feet (60 960 mm).
The distance of travel from any point within a *mall* of a *covered mall building* to an *exit* shall be not greater than 200 feet (60 960 mm). The maximum distance of travel from any point within an *open mall* <u>to an *exit* or</u> to the perimeter line of the *open mall building* shall be not greater than 200 feet (60 960 mm).

Reason: The open mall building provisions essentially incorporate a covered mall building design without a roof. Travel distance within the mall of an open mall building should be permitted to terminate an exit, no different than permitted in a covered mall building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding the option to terminate the travel distance measurement at an exit will not impact the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this is a clarification of the requirements for malls. (Vote: 14-0)

Final Hearing Results

G52-21	AS

G57-21

Original Proposal

IBC: SECTION 202 (New), [F] 403.3.1, [F]403.3.1.1, 403.3.1.2 (New); IFC: SECTION 202 (New), 914.3.1.1, 914.3.1.1.1, 914.3.1.1.2 (New)

Proponents: Mark Hopkins, TERPconsulting, TERPconsulting (mhopkins@terpconsulting.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new definition as follows:

SPRINKLER EXPRESS RISER

.
A vertical pipe used to supply water to sprinkler systems in a multiple story building.

VERTICAL WATER SUPPLY ZONE

.
A vertical fire protection zone within the standpipe system or group of floors supplied by a single sprinkler express riser in a high-rise building established by pressure limitations based on the design.

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

[F] 403.3.1 Number of sprinkler risers and system design.~~Each sprinkler system zone in buildings that are more than 420 feet (128 m) in *building height* shall be supplied by not fewer than two risers. Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.~~ The number of sprinkler risers and design shall comply with Section 403.3.1.1 or 403.3.1.2 based on building height.

403.3.1.1 Buildings 420 feet (36.5 m) or less in height. In buildings 420 feet (36.5 m) or less in height, sprinkler systems shall be supplied by a single standpipe or *sprinkler express riser* within each *vertical water supply zone*.

403.3.1.2 Buildings over 420 feet (128 m) in height. In buildings over 420 feet (128 m) in height, aminimum of two standpipes or *sprinkler express risers* shall supply *automatic sprinkler systems* within each *vertical water supply zone*. Each standpipe or *sprinkler express riser* shall supply *automatic sprinkler systems* on alternating floors within the *vertical water supply* zone such that two adjacent floors are not supplied from the same riser.

[F] ~~403.3.1.1~~ 403.3.1.3 Riser location. Standpipes or ~~Sprinkler~~ *sprinkler express risers* shall be placed in *interior exit stairways* and *ramps* that are remotely located in accordance with Section 1007.1.

Reason: The context and application of Sections 403.3.1 is not clear. This section contains multiple requirements which are somewhat convoluted as currently written. Use of the terminology "sprinkler system zone" can be interpreted in multiple ways. The most common application is that a sprinkler system zone relates to all sprinklers and piping downstream of a floor control valve assembly. This is the context used in the NIST World Trade Center Investigation Report NCSTAR 1-4. However, based on the context of Section 403.3.1 and after reviewing the text of G46-0708 which was based on the NIST recommendations, the terminology sprinkler system zone is referring to a vertical sub-section of the overall building wide sprinkler system. Sprinkler system zone refers to all sprinklers and piping on floors supplied within a single *vertical water supply zone* based on design pressure limitations.

The inclusion of the term *standpipe* identifies that combined sprinkler and standpipe risers as used commonly used in the industry and permitted to be used by NFPA 14 to supply sprinkler systems within a *vertical water supply zone.* The diagrams included in Annex A of NFPA 14 have demonstrated this for many years. NFPA 14 Annex A uses the term “zone” which refers to the vertical loops limited by maximum pressure of pumps, gravity tanks, and equipment working pressure but does not explicitly define *vertical water supply zone.* NFPA 20 uses the term *vertical fire protection zone* which has similar if not identical meaning. Adding the terms *standpipe* and *vertical water supply zones* in this section will provide the needed clarification necessary for harmony between the requirements of the codes and referenced standards.

This change is also needed to clarify that there are differences in requirements for buildings having a *building height* greater than 420 feet (128 m). and buildings having a *building height* less than 420 feet (128 m). The change clarifies that a single *standpipe* or *sprinkler express risers* can be used to supply all sprinkler systems within a *vertical water supply zone.* The change also clarifies that there are a minimum of two risers required in buildings having a *building height* greater than 420 feet (128 m). The inclusion of the requirement for sprinkler systems to be supplied from two risers is to limit the impact of a single point failure of a standpipe or *sprinkler express riser.*

Figure 1 shows the configuration for a single *vertical water supply zone* in a building having a *building height less than 420 feet (128 m).*

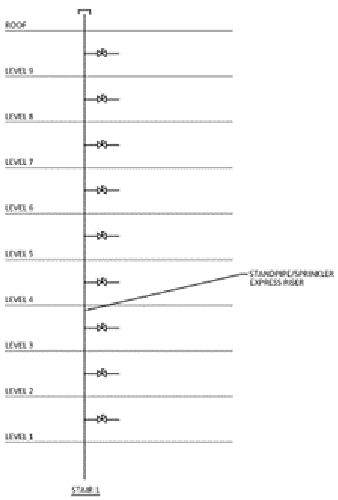


Figure 1. *Sprinkler express risers or standpipes* in high-rise buildings having a *building height* less than 420 ft.

The change also clarifies that two *standpipes* or *sprinkler express risers* are needed to supply sprinkler systems in buildings having a *building height* greater than 420 ft. Figure 2 shows the configuration for a building having a *building height greater than 420 ft.*

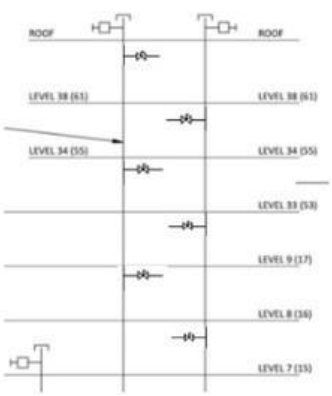


Figure 2. *Sprinkler express risers or standpipes* in high-rise buildings having a *building height greater than* 420 ft.

The change to the relocated 403.3.1.3 is needed to clarify that a standpipe is permitted to be used to supply sprinkler systems. The change is also needed to identify that a *sprinkler express riser(s)* is required to be located within an *interior exit stairway(s) or ramp(s)*.

Cost Impact: The code change proposal will decrease the cost of construction

Clarifying this section reduces construction cost and design time.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that adding the definitions along with the new requirements adds clarity to the code. (Vote: 13-1)

Final Hearing Results

G57-21	AS

G58-21

Original Proposal

IBC: [F] 403.3.3; IFC: 914.3.2

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

[F] 403.3.3 Secondary water supply. An *automatic* secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement in accordance with Section 903.3.1.1, shall be provided for *high-rise buildings* assigned to *Seismic Design Category* C, D, E or F as determined by Section 1613. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the *automatic sprinkler system*. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with ~~NFPA 13~~ Section 903.3.1.1.

Reason: The purpose of this proposal is to clarify the intent of the code section. High-rise buildings will be subject to both NFPA 13 provisions, which have a hose stream requirement, as well as NFPA 14 provisions, which set forth the total hose demand for the standpipe system. The current wording does not clarify which hose demand is to be used in calculating the volume of the secondary water supply. There is significant difference in the required flow rate between the two hose demands. The proposal seeks to clarify that secondary water supply volume is to incorporate the hose stream demand from NFPA 13 only and is not required to satisfy the hose demand from NFPA 14. In keeping with formatting of the I-codes in general, reference to NFPA 13 by name is proposed to be changed to a reference to Section 903.3.1.1.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost impact to construction as it is intended to clarify the intent of this section. Clarifies that NFPA 14 standpipe requirements are not intended to be included.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was based on the clarification of code language that hose stream was only intended to be based upon NFPA 13 versus NFPA 14. (Vote: 14-0)

Final Hearing Results

G58-21	AS

G59-21

Original Proposal

IBC: 403.5.3.1, 1009.8.1, UL Chapter 35 (New) [IFC[BE] 1009.8.1, UL Chapter 80 (New)]

Proponents: Jeffrey Grove, Jensen Hughes, Jensen Hughes (jgrove@jensenhughes.com)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

403.5.3.1 Stairway communication system. A telephone or other two-way communications system connected to an*approved constantly attended station* shall be provided at not less than every fifth floor in each*stairway* where the doors to the *stairway* are locked. Systems shall be listed to UL 2525 and installed per NFPA 72, or an equivalent standard acceptable to the authority having jurisdiction.

1009.8.1 System requirements. Two-way communication systems shall provide communication between each required location and the*fire command center* or a central control point location *approved* by the fire department. Where the central control point is not a *constantly attended location*, the two-way communication system shall have timed, automatic telephone dial-out capability that provides two-way communication with an approved supervising station or emergency services ~~9-1-1~~. The two-way communication system shall include both audible and visible signals. Systems shall be listed to UL 2525 and installed per NFPA 72, or an equivalent standard acceptable to the authority having jurisdiction

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 2525-2020 UL STANDARD FOR SAFETY Two-Way Emergency Communications systems for Rescue Assistance

Reason: A similar proposal was submitted during the 2018-2019 Group A Code Development Cycle (E35-18). This proposal intends to address questions that arose during that Committee Action Hearing and to include modifications to Section 403.5.3.1. NFPA 72 and UL 2525 are applicable to both code sections, hence a single code change proposal has been submitted.
As stated in the previous code change proposal, Section 1009.8 requires that a two-way communication system be installed at the landing serving each elevator or bank of elevators on an accessible floor that is one or more stories above or below the level of exit discharge. This system is vital for the accessible occupants of a building to communicate their need to be rescued in an emergency situation to the appropriate personnel. Currently, the IBC does not require these systems to be monitored for integrity. There is no way to ensure that these systems are operational if, and when, they are needed unless the systems are used at a non-required point in time and found to be in nonworking condition.

The first modification to Section 1009.8.1 is to address the term “emergency services” versus “9-1-1” as the latter is the colloquial term for emergency services in the USA. As this code may be utilized for international locations, and thus this verbiage modification is appropriate. A similar change is not proposed for Section 403.5.3.1 as high-rise buildings are required to be provided with fire command centers which either must be constantly attended, or the life safety systems are required to be monitored at approved constantly attended stations.

The NFPA 72 SIG-ECS committee recognized that the International Building Code (IBC) provided requirements for these systems, but installation requirements have not been correlated with the IBC to this point. This causes signification confusion on projects as to how these systems are to be designed and who should install these systems (e.g., fire alarm, electrician, low voltage, etc.?). The NFPA 72 committee has specifically addressed these concerns with an expanded section in the 2019 Edition of NFPA 72. By requiring this system to be designed and installed with these NFPA 72 requirements, the system's pathways will be monitored for integrity.

During the previous code development cycle, there was confusion as to the impacts of referencing NFPA 72, as well as the terms “area of rescue” vs. “area of rescue assistance”. The NFPA 72 committee recognized these issues, hence the title of the referenced NFPA 72 has been expanded. Further, referencing NFPA 72 does not mean that any building with an accessible floor that is one or more stories above or below the level of exit discharge requires a fire alarm system nor does it necessarily require that the system must be provided with a specific level of pathway survivability. The reference to NFPA 72 is intended to confirm that a two-way communication system is required to be installed per the installation and pathway survivability requirements for two-way communication systems of NFPA 72 Chapter 24. This proposal will provide direction on how to install these systems, and provide requirements for monitoring of the installed systems.

Further to pathway survivability, NFPA 72 outlines emergency communication systems installed in buildings of less than 2-hour fire-resistive construction may be provided with Level 1, 2 or 3 pathway survivability. Buildings of 2-hour fire-resistance or greater are to be provided with Level 2 or 3 pathway survivability. (This has been included in NFPA 72 since the 2013 edition, with the modification to allow Level 1 survivability included in the 2016 edition.)

Level 1 requirements consists of pathways that are located within fully sprinklered buildings in accordance with NFPA 13 with any interconnecting conductors, cables or other physical pathways protected by metal raceways or metal armored cables.

Level 2 requirements consists of 2-hour rated circuit integrity (CI) or fire resistive cable, 2-hour fire-rated cable system (electrical circuit protective system(s)), circuits located within 2-hour enclosures or protected areas, or performance alternatives approved by the AHJ.

Level 3 requirements meet Level 2 plus located within a fully sprinklered building in accordance with NFPA 13.

Example 1: A 3-story B occupancy of Type IIB construction that is fully sprinklered could utilize Level 1 survivability. As such, the conductors, cables or other physical pathways protected by metal raceways or metal armored cables would be acceptable. Further ratings of cables, conductors, etc., would not be required.

Example 2: A 5-story, R-1 occupancy of Type IB construction would require Level 2 or 3 pathway survivability as the building is of at least 2-hour fire-resistance.

Finally, this adds language to mandate compliance with the recently updated and released (June 12, 2020) edition of UL 2525*Standard for Two-Way Emergency Communications Systems for Rescue Assistance*, which provides updated and adequate product listing requirements for these critical systems.

Bibliography: UL 2525 *Standard for Two-Way Emergency Communications Systems for Rescue Assistance*, 2020 Edition.

Cost Impact: The code change proposal will increase the cost of construction
However, these cost increases are justified as the code requirements to date have not provided the means of designing and installing these systems.

Staff Note: E35-21, E36-21 and G59-21 addresses requirements in a different manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

403.5.3.1 Stairway communication system. A telephone or other two-way communications system connected to an*approved constantly attended station* shall be provided at not less than every fifth floor in each*stairway* where the doors to the *stairway* are locked. Systems shall be listed ~~to~~ <u>in accordance with</u> UL 2525 and installed ~~per~~ <u>in accordance with</u> NFPA 72~~, or an equivalent standard acceptable to the authority having jurisdiction~~.

1009.8.1 System requirements. Two-way communication systems shall provide communication between each required location and the *fire command center* or a central control point location *approved* by the fire department. Where the central control point is not a *constantly attended location*, the two-way communication system shall have timed, automatic telephone dial-out capability that provides two-way communication with an approved supervising station or emergency services . The two-way communication system shall include both audible and visible signals. Systems shall be listed ~~to~~ in accordance with UL 2525 and installed ~~per~~ in accordance with NFPA 72.~~, or an equivalent standard acceptable to the authority having jurisdiction.~~

Committee Reason: The modification was approved because the language removed was already addressed under alternative means. The proposal was approved as UL 2525 and NFPA 72 will provide protection for two-way communication systems in highrise stairways, areas of refuge and in elevator lobbies. (Vote: 14-0)

Final Hearing Results

G59-21	AM

G61-21

Original Proposal

IBC: 403.5.3

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

403.5.3 Stairway door operation. *Stairway* doors other than the exit discharge doors shall be permitted to be locked from the *stairway* side. *Stairway* doors that are locked from the *stairway* side shall be capable of being unlocked simultaneously without unlatching upon ~~a~~ one of the following:

1. A signal from the fire command center.
2. Activation of a fire alarm signal in an area served by the stairway.
3. Failure of the power supply.

Reason: This is an important code change for high rise buildings that propose to lock stairway doors from the side opposite to the side from which egress is sought. It is not unusual during an emergency or power outage that building occupants need to access other stories of a building through the stairways. The IBC seems to include provisions for unlocking of locked stairway doors by fire fighting personnel when they arrive at the scene of the incident and assess the situation; it might be quite some time until someone trapped in a vertical exit way can exit the enclosure that may for example blocked at the bottom.
Frequently door locking systems are connected to emergency backup power sources or battery systems and as a result door do not unlock during an emergency. For example, during a power outage, fire department personnel may need to access floors from stairways to perform rescue or evacuation operations for elderly persons who may have difficulty evacuating the building. My jurisdiction had a vandalism incident where hose valves for standpipes serving an 8 level plus two basement building were simultaneously opened, and the fire department was not able to access stories from the stairwell side. The remote unlocking location was not accessible due to flooding and water flow put the building into alarm and evacuation was initiated. Occupants were trapped in the stairways due to rising water level at the discharge level. While not common, this incident highlights that there may be cases where occupants may require options prior to the arrival of fire rescue personnel at at the fire command center.

The Southern Nevada Building Officials have adopted the same requirement see attached.

We request that the General Committee vote to approve this sensible code change prompted by an actual incident in our jurisdiction albeit in a non-high rise building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change will require that the door unlocking mechanism also connect to the fire alarm system however in most cases it already is either through the fire command center or due to common practice when a fire alarm system is present.

Staff Note: Proposals E47-21, G60-21 and G61-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

403.5.3 Stairway door operation. *Stairway* doors other than the exit discharge doors shall be permitted to be locked from the *stairway* side. *Stairway* doors that are locked from the *stairway* side shall be capable of being unlocked simultaneously without unlatching when ~~upon one~~ any of the following conditions occur:

1. Shall unlock individually or simultaneously upon a ~~A~~ signal from the fire command center.
2. Shall unlock simultaneously upon activation ~~Activation~~ of a fire alarm signal in an area served by the stairway.
3. Shall unlock upon failure ~~Failure~~ of the power supply to the lock or the locking system.

Committee Reason: The modification was approved as it added criteria to make the locks fail safe. The proposal was approved as this adds options for unlocking of stairway door operations. The options allows for automatic opening in addition to manual opening options. (Vote: 9-3)

Final Hearing Results

G61-21	AM

G62-21

Original Proposal

IBC: 404.6

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

SECTION 404
ATRIUMS

Revise as follows:

404.6 Enclosure of atriums. *Atrium* spaces shall be separated from adjacent spaces by a 1-hour *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both.

Exceptions:

1. A *fire barrier* is not required where a glass wall forming a *smoke partition* is provided. The glass wall shall comply with all of the following:
   1.1. *Automatic* sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the *atrium* side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;

   1.2. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and

   1.3. Where glass doors are provided in the glass wall, they shall be either *self-closing* or automatic-closing.

2. A *fire barrier* is not required where a glass-block wall assembly complying with Section 2110 and having a $^{3}/_{4}$-hour *fire protection rating* is provided.

3. A *fire barrier* is not required between the *atrium* and the adjoining spaces of up to three floors of the *atrium* provided that such spaces are accounted for in the design of the smoke control system.

4. In other than Group I-2, and Group I-1, Condition 2, a~~A~~ *fire barrier* is not required between the *atrium* and the adjoining spaces where the *atrium* is not required to be provided with a smoke control system.

5. In Group I-2 and Group I-1, Condition 2, a fire barrier is not required between the atrium and the adjoining spaces, other than care recipient sleeping or treatment rooms, for up to three stories of the atrium provided that such spaces are accounted for in the design of the smoke control system and are not providing access to care recipient sleeping or treatment rooms.

~~5.~~6. A *horizontal assembly* is not required between the *atrium* and openings for escalators complying with Section 712.1.3.

~~6.~~7. A *horizontal assembly* is not required between the *atrium* and openings for *exit access stairways* and *ramps* complying with Item 4 of Section 1019.3.

Reason: These proposed changes to Section 404.6 Atriums brings the provisions of the IBC to be an equivalence to that of the 2012 Life Safety Code. As such it brings the provisions in alignment with federal regulatory guidelines for certification of health care facilities. A comparative review was made of the provisions of Section 8.6.7 of the 2012 LSC to that of the 2021 IBC sections 404.6. What is presented in the proposal addresses any differences in levels of protection or location of the protection required to separate the atrium from adjoining rooms or spaces. Further the provisions of IBC Sections 404.9 and 404.10 were compared to the provisions of Section 7.7.2 of the 2012 LSC and found to be equivalent. Review was based on the references from 2012 LSC section 18.3.1.1 – 18.3.1.5 for healthcare facilities

with vertical openings.
This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There should be no increase in the cost of construction for Group I-2 and Group I-1 condition 2 facilities as they had had to be constructed in conformity with LSC in order to gain federal certification. Facilities that don't receive federal certification also should not see significant cost increases as the proposal makes more of a change to the configuration of what can be adjoining rooms and spaces to the atrium.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it clarifies the requirements for atriums in hospitals. This is needed to match the federal certification requirements for healthcare. (Vote: 13-1)

Final Hearing Results

G62-21	AS

G63-21

Original Proposal

IBC: 404.10

Proponents: David Collins, The Preview Group, Inc, The American Institute of Architects (dcollins@preview-group.com)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 404
ATRIUMS

Revise as follows:

404.10 Exit stairways in an atrium. Where an *atrium* contains an *interior exit stairway* all the following shall be met:

1. The entry to the *exit stairway* is the edge of the closest riser of the *exit stairway.*
2. The entry of the *exit stairway* shall have access from a minimum of two directions.
3. The distance between the entry to an *exit stairway* in an *atrium* and the entrance to a minimum of one *exit stairway* enclosed in accordance with Section 1023.2 shall comply with the separation required by Section 1007.1.1.
4. *Exit access* travel distance shall be measured to the closest riser of the *exit stairway*.
5. Not more than 50 percent of the *exit stairways* shall be located in the same *atrium*.
6. <u>The discharge from the exit stairway at the level of exit discharge shall comply with Section 1028.1</u>.

Reason: Code Provisions allowing an Interior Exit Stair in an Atrium were first included in the 2018 edition of the IBC. The definition allows the design and construction of an interior exit stair in an atrium as part of the required means of egress from a building.
Interior exit stair is defined as:

[BE] INTERIOR EXIT STAIRWAY.

An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

Typically the design of an interior exit stairway provides a protected path through an enclosure for an interior exit stair as found in 1023.1. There are three specific provisions within this section: 1. required enclosure, 2. must lead directly to the exterior and 3. not used for any purpose other than means of egress and a circulation path. Section 1021.1 establishes the elements of construction that are intended to provide the design elements for an interior exit stairway, but adds additional specific features of them.

1023.1 General. *Interior exit stairways and ramps serving as an exit component in a means of egress system shall comply with the requirements of this section. Interior exit stairways and ramps <u>shall be enclosed</u> and <u>lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit</u> <u>passageway</u> conforming to the requirements of Section 1024, except as permitted in Section 1028.1. An interior exit stairway or ramp <u>shall not be used for any purpose other than as a means of egress and a circulation path.</u>*

.

(NOTE: This is not a code change, the underlining is for emphasis only.)

The requirement for an enclosure of an interior exit stair is contained in Section 1023.2 (construction). The requirements for an interior exit stair to lead directly to the exterior is found in Section 1028 (exit discharge). A stairway used for an interior stair can't be used for any purpose other than means of egress and a circulation path. Section 1028 also provides for how an interior exit stair may pass through other functional areas within the building.

1023.2 Construction. *Enclosures for interior exit stairways and ramps shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both. Interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps shall include any basements, but not any mezzanines. Interior exit stairways and ramps shall have a fire- resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.*

Exceptions:

1. *Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.* *Interior exit stairways within an atrium enclosed in accordance with Section*
2. *404.6.*

(NOTE: This is not a code change, the underlining is for emphasis only.)

Exception 2 specifically allows the construction of an interior exit stair within an atrium per Section 404.6 to be used for compliance in lieu of the 2-hour fire-resistance rated and 1-hour fire resistance rated enclosure. Section 404.6 similarly states that a 1-hour barrier must be installed between the atrium and adjacent spaces, but provides four exceptions; 1. a glass wall, 2. A glass-block wall with ¾ hr. rating, 3. no wall where a maximum of three floors that are included in the design of the smoke control system, or no wall between the atrium and a maximum of three floors where a smoke control system is not required.

404.6 Enclosure of atriums.

Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier con- structed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both.

Exceptions:

1. A fire barrier is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following:

1.1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;

1.2. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and

1.3. Where glass doors are provided in the glass wall, they shall be either self-closing or automatic-closing.

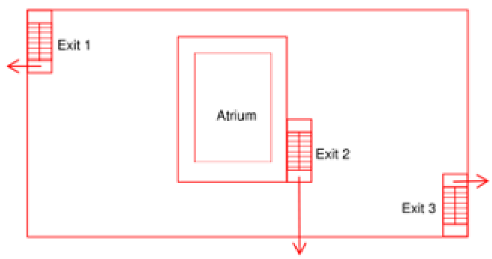
2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 and having a 3/4-hour fire protection rating is provided.

3.
A fire barrier is not required between the atrium and the adjoining spaces of up to three floors of the atrium provided that such spaces are accounted for in the design of the smoke control system
.

4. A fire barrier is not required between the atrium and the adjoining spaces where the atrium is not required to be provided with a smoke control system.

(NOTE: This is not a code change, the underlining is for emphasis only.)

According to 1023.1, an interior exit stairway must not be used for any purpose except to serve as egress and circulation. A interior exit stairway in an atrium enclosure or in a standard stair enclosure are required to be kept clear and unobstructed and not to be used for any other purpose. It has been construed that this provision limits the entire atrium enclosure to not be used for any other purpose, but the code language in 1023.1 specifically speaks to the stairway as defined as an "interior exit stairway," not its enclosure.



This plan illustrates three interior exit stairs. Two that discharge directly to the outside and one stair that is located in the Atrium and discharges through an occupied space. All three stairs would be required to be enclosed, although Exit 2 will discharge through an occupied space that is contiguous with the atrium as permitted by Section 1028.1.

[BE] 1028.1 General.

Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide a direct path of egress travel to grade. The exit discharge shall not reenter a building.
The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required exits.

Exceptions:

1.
Not more than 50 percent of the number and minimum width or required capacity of interior exit stairways and ramps is permitted to egress through areas on the level of discharge provided that all of the following conditions are met
:

1.1. Discharge of interior exit stairways and
ramps shall be provided with a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure
.

1.2.
The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the enclosure
.

1.3.
The egress path from the interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. Portions of the level of exit discharge with access to the egress path shall either be equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of interior exit stairways or ramps
.

1.4. Where a required interior exit stairway or ramp and an exit access stairway or ramp serve the same floor level and terminate at the same level of exit discharge, the termination of the exit access stairway or ramp and the exit discharge door of the interior exit stairway or ramp shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall *diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the interior exit stairway or ramp and the last tread of the exit access stairway or termination of slope of the exit access ramp.*

2. Not more than 50 percent of the number and minimum width or required capacity of the interior exit stairways and ramps is permitted to egress through a vestibule provided that all of the following conditions are met:

2.1. The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating of the interior exit stairway or ramp enclosure.

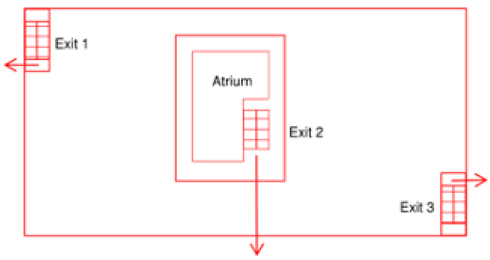
2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

2.3. The area is separated from the remainder of the level of exit discharge by a fire partition constructed in accordance with Section 708 of the International Building Code.

***Exception:** The maximum transmitted temperature rise is not required.*

2.4. The area is used only for means of egress and exits directly to the outside.

3. Horizontal exits complying with Section 1026 shall not be required to discharge directly to the exterior of the building.



According to 1028.1, one of the exit stairs in the example plan would be allowed to discharge through the occupied space where the criteria for the path to the exterior met the requirements of this section. Similarly, when meeting these limits an interior exit stair in an atrium would be allowed to discharge through that same occupied space. Exit stair 2 in this configuration is unenclosed as permitted by 1023.2, exception 2 and per Section 404.6 because of the four exceptions which establish how an atrium is to be enclosed. The interior exit stair can discharge directly to the outside through an area on the level of exit discharge as would an enclosed stair.

In the 2021 edition of the IBC additional criteria have been added in Section 404.10 describing the conditions for design of an interior exit stairway in an atrium.

404.10.1 Exit stairways in an atrium.

Where an atrium contains an interior exit stairway all the following shall be met:

1. *The entry to the exit stairway is the edge of the closest riser of the exit stairway.*
2. *The entry of the exit stairway shall have access from a minimum of two directions.*
3. *The distance between the entry to an exit stairway in an atrium, and the entrance to a minimum of one exit stair stairway enclosed in accordance with Section 1023.2 shall comply with the separation in Section 1007.1.1.*
4. *Exit access travel distance shall be measured to the closest riser of the exit stairway.*
5. *Not more than 50 percent of the exit stairways shall be located in the same atrium.*

This code change adds a reference to Section 1018 for discharge from an atrium stair allowing it through an occupied space.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply clarifies that the discharge of the exit stairway in an atrium must comply with the same provisions for all exit stairways. This would not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it clarifies an exit stairway can egress through the ground floor lobby. (Vote: 14-0)

Final Hearing Results

G63-21	AS

G65-21

Original Proposal

IBC: 406.2.1

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

SECTION 406 MOTOR-VEHICLE-RELATED OCCUPANCIES

Revise as follows:

406.2.1 Automatic door ~~openers~~ operators and vehicular gates. Where provided, ~~Automatic~~ automatic garage door ~~openers~~ operators, and automatic rolling door operators or systems, shall be *listed* and *labeled* in accordance with UL 325. Where provided,*automatic vehicular gates* shall comply with Section 3110.

Reason:

- Rolling door operators or systems should be included, since they can also be used in similar applications as automatic garage door openers, provided they are listed and labeled to UL 325.
- "Where provided" is needed, since automating a garage door or rolling door is at the discretion of the building owner or design professional.
- The term "operator" is used for consistency with the terminology used in UL 325.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarity and additional options for installation.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
406.2.1 Automatic door operators and vehicular gates. Where provided, automatic garage door operators~~, and automatic rolling door operators or systems,~~ shall be *listed* and *labeled* in accordance with UL 325. Where provided,*automatic vehicular gates* shall comply with Section 3110.

Committee Reason: The modification was recommended by the automatic door industry to minimize confusion caused by using multiple terms. The proposal was approved as this makes it clear the automatic door openers are a choice. (Vote: 13-0)

Final Hearing Results

G65-21	AM

G71-21

Original Proposal

IBC: 407.4.4, 407.4.4.4 (New)

Proponents: William Koffel, Koffel Associates, Inc., Self (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 407
GROUP I-2

Revise as follows:

407.4.4 Group I-2 care suites. *Care suites* in Group I-2 shall comply with Sections 407.4.4.1 through ~~407.4.4.4~~ 407.4.4.5 and either Section ~~407.4.4.5~~ 407.4.4.6 or ~~407.4.4.6~~ 407.4.4.7.

407.4.4.3 Access to corridor. Every *care suite* shall have a door leading directly to an *exit access corridor* or *horizontal exit*. Movement from habitable rooms within a *care suite* shall not require more than 100 feet (30 480 mm) of travel within the *care suite* to a door leading to the *exit access corridor* or *horizontal exit*. Where a *care suite* is required to have more than one *exit access* door by Section 407.4.4.5.2 or 407.4.4.6.2, the additional door shall lead directly to an *exit access corridor*, *exit* or an adjacent suite.

Add new text as follows:

407.4.4.4 Circulating space within a care suite. The circulating space within a care suite providing the access to the door required in Section 407.4.4.3 shall have a minimum width of 36 inches (914 mm) and shall not be required to meet the requirements for a corridor or an aisle.

Revise as follows:

~~407.4.4.4~~ 407.4.4.5 Doors within care suites. Doors in *care suites* serving habitable rooms shall be permitted to comply with one of the following:

1. Manually operated horizontal sliding doors permitted in accordance with Exception 9 to Section 1010.1.2.
2. *Power-operated doors* permitted in accordance with Section 1010.1.2, Exception 7.
3. *Means of egress* doors complying with Section 1010.

Reason: There is a lot of confusion regarding the space through which one travels within a Group I-2 care suite to gain access to the door leading to a corridor. Due to the definition of a corridor, some apply corridor requirements to this space. It has not been the intent of the Code that corridor requirements apply within these suites. If corridor requirements were to be applied, there would be limitations on the areas that may be open to the space, patient care would not be permitted in an area open to this space, dead end limits would apply, and corridor wall and door requirements would apply. Some have also required that the clear width of the space be 96 inches since that is the minimum width required for a corridor used for bed movement in a Group I-2 occupancy. Since the proposal language clearly states that the space is not a corridor a minimum width requirement is included.

This issue was identified during a meeting of the ICC Committee on Healthcare but the Committee did not have time to develop a proposal to address the issue. While the proponent is a member of the ICC Committee on Healthcare, the proposal has not been submitted on behalf of that Committee.

Acceptance of the proposal would be consistent with the requirements in NFPA 101 which is used for Federal certification of most health care facilities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies the intent of the Code and as such there should be no impact on the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
407.4.4.4 Circulation paths ~~Circulating space~~ within a care suite. The circulation paths ~~circulating space~~ within a care suite providing the access to ~~the door~~ doors required in Section 407.4.4.3 shall have a minimum width of 36 inches (914 mm) and shall not be required to meet the requirements for a corridor or an aisle.

Committee Reason: The modification changed circulating space to circulation path which is easier to understand. The proposal was approved as it separates 36" wide circulation paths within suites from the 72" wide corridors needed for movement of beds in corridors. (Vote: 13-1)

Final Hearing Results

G71-21	AM

G76-21

Original Proposal

IBC:410.2.1.1

Proponents: William Conner, American Society of Theatre Consultants, American Society of Theatre Consultants (bill@bcaworld.com)

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

410.2.1.1 Stage height and area. Stage areas shall be measured to include the entire performance area and adjacent backstage and support areas not separated from the performance area by fire-resistance-rated construction. *Stage* height shall be measured from the lowest point on the *stage* floor to the highest point of the underside of the roof or floor deck above the *stage*.

Reason: The building code has settled on the stage height, a measurement in the vertical dimension of the volume of the stage, as a determining factor for other code requirements. The vertical dimension of the stage is used to quantify how much combustible stage scenery may be present and the effectiveness of fire suppression systems. Is it understood for this vertical measurement to be from the lowest point of the stage floor to the highest point of the underside of the roof deck or floor deck structure above. Measuring to the top of the roof deck, floor deck, or any other protruding roof elements, does not accurately gauge the volume usable for combustible stage scenery and proven and tested effective fire suppression. The limiting factor for scenery and fire suppression is the height of the bottom of the structure over the stage.
For example, if a roof mounted mechanical smoke evacuation system added +4'-0" of height to a portion of the roof, this does not allow for +4'-0" of additional space inside the stage for the storage of combustible stage scenery nor does it raise effective height of fire suppression systems. Therefore, this additional +4'-0" of height is not applicable to the measurement of stage height for code purposes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Change is for clarification and should have no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it clarifies how stage height should be measured. (Vote: 13-1)

Final Hearing Results

G76-21 AS

G79-21

Original Proposal

IBC: 410.2.4

Proponents: Jeffrey Grove, Jensen Hughes, Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

410.2.4 Proscenium wall. Where the *stage* height is greater than 50 feet (15 240 mm), all portions of the*stage* shall be completely separated from the seating area by a *proscenium wall* with not less than a 2-hour*fire-resistance rating* extending continuously from the foundation to the roof.

> <u>**Exception:** Where a stage is located in a building of Type I construction, the proscenium wall is permitted to extend continuously from a minimum 2-hour fire-resistance-rated floor slab of the space containing the stage to the roof or a minimum 2-hour fire-resistance-rated floor deck above.</u>

Reason: The purpose of the proposed code change is to clarify the code.
Stages in theaters and showrooms are often located in mixed-use facilities, not necessarily dedicated buildings. In such facilities, stages are typically not located in a space in which the floor is also the foundation of the building. On the contrary, in many mixed-use facilities that contain a stage that requires a proscenium wall, there are typically one or more occupied floor levels beneath the theater, showroom, ballroom, etc. containing the stage. The current language of IBC Section 410.2.4 would require the proscenium wall for these stages to dissect the entire height of the building even though the stage is only located in a single space within the building. The proposed code change would allow the proscenium to terminate at the 2-hour fire-resistance rated floor assembly of the space containing the stage. The proposed code change would only apply to stages in buildings of Type I construction since such buildings are required by IBC Table 601 to always have minimum 2-hour fire-resistance rated floor construction.

The intent of the proscenium wall required by Section 410.2.4 is to protect the audience from the potentially increased hazard on stages with heights greater than 50 feet, which permits multiple settings and large amounts of scenery in dense configurations (i.e., an increased fuel load). The proposed code change still meets the intent of Section 410.2.4, and there is precedence for allowing the 2-hour fire-resistance rated proscenium wall to terminate at a 2-hour fire-resistance floor assembly. Section 1026.2 requires horizontal exit separations to extend vertically through all levels of the building unless floor assemblies have a minimum fire-resistance rating of 2-hour with no unprotected openings. The proposed code change provides a similar allowance to that provided in Section 1026.2 for horizontal exit separations.

For reference, this approach of terminating proscenium walls has been successfully utilized for approximately 15 years in Southern Nevada.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal could reduce the cost of construction as the two-hour wall could terminate into two-hour fire-resistance floor assemblies, or the roof, rather than extending through additional floor levels which do not contain the stage.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because the exception did maintain the fire protection continuity for the stage. This has already been proven to be effective in many existing stage constructions. (Vote: 14-0)

Final Hearing Results

G79-21	AS

G82-21

Original Proposal

IBC: 410.4.1, 410.4.2

Proponents:
William Conner, representing American Society of Theatre Consultants (bill@bcaworld.com); Homer Maiel, PE, CBO, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

410.4.1 Separation from stage. The *stage* shall be separated from dressing rooms, scene docks, property rooms, workshops, storerooms and compartments ~~appurtenant~~ contiguous to the *stage* and other parts of the building by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than 2 hours for *stage* heights greater than 50 feet (15 240 mm) and not less than 1 hour for *stage* heights of 50 feet (15 240 mm) or less.

410.4.2 Separation from each other. Dressing rooms, scene docks, property rooms, workshops, storerooms and compartments ~~appurtenant~~ contiguous to the *stage* shall be separated from each other by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

Reason: .
Conner:

An “appurtenant” space may be down the corridor or in an adjacent building; where as a contiguous space is adjacent and connected, “sharing a common border or touching” in many definitions. This requirement is to protect stages and auditoriums from the fire hazards unique to shops, dressing rooms, storage, and such spaces associated with the performing arts.

Maiel:

The word “appurtenant” is confusing. In the dictionary, this word is defined as “pertinent” and “accessory” . The word “pertinent” is defined as: “having some connection with matter at hand”, “relevant”. Any of these definitions could distort the intent of the code. Apparently, this word came into the code from BOCA. The last UBC (1997) used word “contiguous” for these two sections which is more appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Conner: No change, just for clarity.

Maiel: This change makes the intend of the code more clearer. It does not change any technical requirement.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this change makes the requirements easier to understand and enforce. (Vote: 13-1)

Final Hearing Results

G82-21 AS

G84-21

Original Proposal

IBC: [F] 410.6; IFC: 914.6.1

Proponents: William Conner, American Society of Theatre Consultants, American Society of Theatre Consultants (bill@bcaworld.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

[F] 410.6 Automatic sprinkler system. *Stages* shall be equipped with an*automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the *stage*. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such *stages*.

Exceptions:

1. Sprinklers are not required under *stage* areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X *gypsum board* not less than $^5/_8$-inch (15.9 mm) in thickness.
2. Sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on*stages*.
4. <u>Sprinklers are not required under catwalks and galleries under the maximum widths as permitted by NFPA 13</u>.

Reason: This is common practice on most projects. Catwalks under 48" open on both sides or 36" when against a wall like ducts do not require sprinklers under them. This change clarifies that.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No significant change.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was based on the addition of the language of the new exception. The exception helps clarify the code by placing a pointer directly to NFPA 13 for the allowance. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 410 STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS .

[F] 410.6 Automatic sprinkler system . *Stages* shall be equipped with an*automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the *stage*. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such *stages*.

Exceptions:

1. Sprinklers are not required under *stage* areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X *gypsum board* not less than $^5/_8$-inch (15.9 mm) in thickness.
2. Sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on*stages*.
4. Sprinklers are not required under catwalks and galleries~~under the maximum widths as permitted by NFPA 13~~. <u>where they are permitted to be omitted inaccordance with Section 903.3.1.1</u>

2021 International Fire Code

914.6.1 Automatic sprinkler system . Stages shall be equipped with an*automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than $^5/_8$ inch (15.9 mm) in thickness.
2. Sprinklers are not required for stages 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on stages.
4. Sprinklers are not required under catwalks and galleries ~~under the maximum widths as permitted by NFPA 13~~. <u>where they are permitted to be omitted inaccordance with Section 903.3.1.1</u>

Commenter's Reason: This language is misleading and confusing. Bringing installation requirements out of the standards and into the codes is a bad practice. NFPA 13 already clearly addresses when sprinklers are not required under obstructions. This proposal leaves the user with the possibility to incorrectly interpret that sprinklers may be omitted from under other similar obstructions that NFPA 13 would require to be protected.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is already a NFPA 13 requirement. This simply cleans up the language.

Final Hearing Results

G84-21 AMPC1

G85-21

Original Proposal

IBC: [F] 410.7; IFC: 905.3.4 (IBC: [F] 905.3.4), 905.5.1 (IBC:[F] 905.5.1), 914.6.2

Proponents: William Conner, American Society of Theatre Consultants, American Society of Theatre Consultants (bill@bcaworld.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Delete without substitution:

~~**[F] 410.7 Standpipes.** *Standpipe systems* shall be provided in accordance with Section 905~~.

Reason: Delete requirement for standpipes on stages. This requirement goes back 100+ years when most stages were staffed by trained employees and the standpipe with hose was intended for occupant fire fighting, not the fire service. Today, when most stages are in public schools without full time staff trained to fight fires on stages, it makes no sense. It is an archaic requirement. More and more building and/or fire officials request or require these not be installed or, where installed, request these be removed, to discourage or prevent non-fire service occupants from fighting fires. I do not believe fire service would use these, located in the space where the fire is.

Cost Impact: The code change proposal will decrease the cost of construction
A very slight reduction by not requiring a standpipe but not the cost savings is not the reason for this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the approval was based on the proponent's reason statement. (Vote: 14-0)

Final Hearing Results

G85-21	AS

G86-21 Part I

Original Proposal

PART I - IBC: SECTION 202, 411.1, 411.5, 411.6, 411.6.1, 411.7, TABLE 903.2.11.6; ICCPC: [BG] A103.1.9.12
PART II - IFC: 105.5.3, SECTION 202 (New), TABLE 903.2.11.6, 907.2.12 (IBC[F]907.2.12), 907.2.12.1(IBC[F]907.2.12.1), 907.2.12.2(IBC[F]907.2.12.2), 907.2.12.3(IBC[F]907.2.12.3), 914.7, 914.7.2, 914.7.2.1 (New), 914.7.2.2 (New), 914.7.2.3 (New); IBC: [F]411.3, 411.3.1 (New), 411.3.2 (New), [F]411.4

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[BG] SPECIAL AMUSEMENT AREA.
A ~~special amusement area is any~~ temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and is arranged in a manner that meets one or more of the following descriptions:

1. Makes the means of egress path not readily apparent due to visual or audio distractions.
2. Intentionally confounds identification of the means of egress path.
3. Otherwise makes the means of egress path not readily available because of the nature of the attraction or mode of conveyance through the building or structure.

[BG] PUZZLE ROOM.
A puzzle room is a type of *special amusement area* in which occupants are encouraged to solve a challenge to escape from a room or series of rooms. A puzzle room is sometimes referred to as an escape room.

SECTION 411
SPECIAL AMUSEMENT AREAS

Revise as follows:

411.1 General. *Special amusement areas* having an *occupant load* of 50 or more shall comply with the requirements for the appropriate Group A occupancy and Sections 411.1 through 411.7. *Special amusement areas* having an *occupant load* of less than 50 shall comply with the requirements for a Group B occupancy and Sections 411.1 through 411.7.

~~Exception~~ Exceptions:

1. Special amusement areas that are without walls or a roof and constructed to prevent the accumulation of smoke ~~need~~ are not required to comply with this section.
2. *Puzzle rooms* provided with a *means of egress* that is unlocked, readily identifiable and always available are not required to comply with this section.

Delete without substitution:

~~**411.5 Puzzle room exiting.** *Puzzle room* exiting shall comply with one of the following:~~

~~1. Exiting in accordance with Chapter 10.~~

2. ~~An alternative design *approved* by the *building official*.~~

3. ~~*Exits* shall be open and readily available upon activation by the *automatic fire alarm system*, *automatic sprinkler system*, and a manual control at a *constantly attended location*.~~

Revise as follows:

411.4 **~~411.6~~ Exit marking.** Exit signs shall be installed at the required *exit* or *exit access doorways* serving *special amusement areas* in accordance with this section and Section 1013. *Approved* directional exit markings shall be provided. Where mirrors, mazes or other designs ~~are utilized that~~ disguise the path of egress travel such that ~~they are~~ the path of egress travel is not apparent, *approved* and *listed* low-level exit signs that comply with Section 1013.5, and directional path markings *listed* in accordance with UL 1994, shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the *automatic smoke detection system* and the *automatic sprinkler system* in accordance with Section 411.3.2. ~~907.2.12.~~

~~411.6.1~~ 411.4.1 Photoluminescent exit signs. Where *photoluminescent exit* signs are installed, such signs shall be *listed*, and the activating light source and viewing distance shall be in accordance with the listing and markings on ~~of~~ the signs.

411.5 **~~411.7~~ Interior finish.** ~~The *interior*~~ *Interior wall and ceiling* *finish* materials in *special amusement areas* shall ~~be~~ meet the *flame spread index* and *smoke-developed index* requirements for Class A in accordance with Section 803.1.

411.6 Flammable decorative materials. *Flammable decorative materials* shall comply with Section 806.

TABLE 903.2.11.6 ADDITIONAL REQUIRED PROTECTION SYSTEMS

Portions of table not shown remain unchanged.

SECTION	SUBJECT
411.3	Special amusement buildings areas

Reason: This proposal executes numerous fixes and clean-ups related to Proposal G48-18, which updated some provisions related to special amusement buildings and added provisions for puzzle rooms. Unfortunately, there were some shortcomings in that proposal that remained undiscovered until after it was too late to fix these in the 2021 edition. Explanation for individual changes are as follows:
IFC:

- 105.5.3: Updates the old "special amusement building" references to the new "special amusement area" concept.
- 202: Updates and correlates the IFC definition of "special amusement area" with the updated 2021 definition in the IBC.
- Table 903.2.11.6: Updates the old "special amusement building" references to the new "special amusement area" concept.
- 907.2.12: Updates the old "special amusement building" references to the new "special amusement area" concept. Also, moves the content from 907.2.12 to 914.7 so that all of the special amusement area requirements are in one place. Section 914 is the appropriate location for all of this text.
- 914.7: Adds a reference to the IBC for other important safety requirements and brings in the exceptions that are currently in IBC Section 411, which negate having to comply with special amusement area requirements for outdoor areas and for some puzzle rooms. This addresses/eliminates a current conflict between the codes. The definition of "puzzle room" has also been pulled into the IFC from the IBC since the term will now appear in the IFC.
- 914.7.2: Brings in the fire alarm requirements previously located in 907.2.12 with edits for improved clarity. The term "throughout" has been added for clarity. The IBC Section 411.3 stated "buildings containing special amusement areas" require detection and alarm, and the term "throughout" emphasizes that the requirement applies to the building, not just the special amusement area per the IBC provision. Other changes in this section and the following sections in 914.7 are intended as non-technical edits to improve flow and clarity.

IBC:

- 202: The definition of special amusement area has been edited for clarity.

- Table 903.2.11.6 and Section 907.2.12 changes have the same reasons as companion changes to the IFC described above.
- 411.1: a second exception has been added for "puzzle rooms," a term that was added in the 2021 code by Proposal G48-18. This exception is essential for the proper application of Section 411 to puzzle rooms, but when Proposal G48-18 was entered into cdpACCESS last cycle, the text was somehow omitted, which went unnoticed until it was too late to fix the mistake in the 2021 code.
- 411.3: this section has been updated to correlate with the revised (herein) IFC Section 914.7 re detection and alarm systems.
- 411.5: this section should have been omitted from Proposal G48-18, but it was mistakenly included and went unnoticed until it was too late to fix the mistake in the 2021 code. When the second exception was added to Section 411.1, this section was no longer needed.
- ~~411.6~~ (now 411.4): changes are intended as non-technical clarifications. Re. photoluminescent signs, the section required compliance with listing criteria, but didn't previously have a specific reference that required listed signs.
- ~~411.7~~ (now 411.5): changes are intended as non-technical clarifications.
- 411.6 (new): regulation of flammable decorative materials was previously included in this section, but Proposal G48-18 inadvertently omitted it when the provisions were re-written.

ICC Performance Code

- Updates and correlates the introductory text, which was originally copied from the former definition of "special amusement building." The proposed text is copied from the 2021 definition of "special amusement area" in the IBC and proposed herein for the IFC.

Cost Impact: The code change proposal will decrease the cost of construction
Most of the recommended changes are non-technical and simply improve usability of the code. However, the change that adds a new exception for puzzle rooms will reduce the code of construction for some of these uses by not requiring qualifying puzzle rooms to meet regulations for special amusement areas.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was an editorial clean up of the requirements for special amusement buildings and puzzle rooms. (Vote: 14-0)

Final Hearing Results

G86-21 Part I	AS

G86-21 Part II

Original Proposal

PART II - IFC: 105.5.3, SECTION 202 (New), TABLE 903.2.11.6, 907.2.12 (IBC[F]907.2.12), 907.2.12.1(IBC[F]907.2.12.1), 907.2.12.2(IBC[F]907.2.12.2), 907.2.12.3(IBC[F]907.2.12.3), 914.7, 914.7.2, 914.7.2.1 (New), 914.7.2.2 (New), 914.7.2.3 (New); IBC: [F]411.3, 411.3.1 (New), 411.3.2 (New), [F]411.4

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Building Code

[F] 411.2 Automatic sprinkler system. Buildings containing *special amusement areas* shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Where the*special amusement area* is temporary, the sprinkler water supply shall be of an *approved* temporary means.

> **Exception:** *Automatic* sprinklers are not required where the total floor area of a temporary*special amusement area* is less than 1,000 square feet (93 m^2) and the *exit access* travel distance from any point in the*special amusement area* to an exit is less than 50 feet (15 240 mm).

Revise as follows:

411.3 Detection and alarm systems ~~Fire alarm system~~. Buildings containing *special amusement areas* shall be equipped throughout with an *automatic smoke detection system* and an *emergency voice/alarm communications* system in accordance with Section 907 ~~907.2.13~~. Pre-signal alarms and alarm activation shall comply with Sections 411.3.1 and 411.3.2, and*emergency voice/alarm communications* systems shall comply with Section 411.3.3.

Add new text as follows:

411.3.1 Alarm pre-signal. Activation of any single smoke detector, the*automatic sprinkler system* or any other single automatic fire detection device shall immediately initiate an audible and visible alarm at a constantly attended location at the *special amusement area* from which emergency action can be initiated, including the capability of manual initiation of requirements in Section 411.3.2.

411.3.2 Alarm activation. Activation of two or more smoke detectors, a single smoke detector equipped with an alarm verification feature, two or more other approved fire detection devices, the *automatic sprinkler system*, or a manual control located at the constantly attended station required by Section 411.3.1 shall automatically accomplish all of the following:

1. Automatically illuminate the means of egress with an illumination level not less than 1 footcandle (11 lux) at the walking surface level.
2. Stop conflicting or confusing sounds and visual distractions.
3. Activate approved directional exit markings.
4. Activate a prerecorded message, audible throughout the special amusement area, instructing occupants to proceed to the nearest exit. Alarm signals used in conjunction with the prerecorded message shall produce a sound that is distinct from other sounds used during normal operation of the special amusement area .

Revise as follows:

[F] ~~411.4~~ 411.3.3 Emergency voice/alarm communications system. An *emergency voice/alarm communications system* ~~shall be provided in accordance with Section 907.2.12~~ complying with Section 907.5.2.2 shall be installed in and audible throughout special amusement areas. The emergency voice/alarm communications system is allowed to also serve as a public address system.

Reason: This proposal executes numerous fixes and clean-ups related to Proposal G48-18, which updated some provisions related to special amusement buildings and added provisions for puzzle rooms. Unfortunately, there were some shortcomings in that proposal that remained undiscovered until after it was too late to fix these in the 2021 edition. Explanation for individual changes are as follows:
IFC:

- 105.5.3: Updates the old "special amusement building" references to the new "special amusement area" concept.
- 202: Updates and correlates the IFC definition of "special amusement area" with the updated 2021 definition in the IBC.
- Table 903.2.11.6: Updates the old "special amusement building" references to the new "special amusement area" concept.
- 907.2.12: Updates the old "special amusement building" references to the new "special amusement area" concept. Also, moves the content from 907.2.12 to 914.7 so that all of the special amusement area requirements are in one place. Section 914 is the appropriate location for all of this text.
- 914.7: Adds a reference to the IBC for other important safety requirements and brings in the exceptions that are currently in IBC Section 411, which negate having to comply with special amusement area requirements for outdoor areas and for some puzzle rooms. This addresses/eliminates a current conflict between the codes. The definition of "puzzle room" has also been pulled into the IFC from the IBC since the term will now appear in the IFC.
- 914.7.2: Brings in the fire alarm requirements previously located in 907.2.12 with edits for improved clarity. The term "throughout" has been added for clarity. The IBC Section 411.3 stated "buildings containing special amusement areas" require detection and alarm, and the term "throughout" emphasizes that the requirement applies to the building, not just the special amusement area per the IBC provision. Other changes in this section and the following sections in 914.7 are intended as non-technical edits to improve flow and clarity.

IBC:

- 202: The definition of special amusement area has been edited for clarity.
- Table 903.2.11.6 and Section 907.2.12 changes have the same reasons as companion changes to the IFC described above.
- 411.1: a second exception has been added for "puzzle rooms," a term that was added in the 2021 code by Proposal G48-18. This exception is essential for the proper application of Section 411 to puzzle rooms, but when Proposal G48-18 was entered into cdpACCESS last cycle, the text was somehow omitted, which went unnoticed until it was too late to fix the mistake in the 2021 code.
- 411.3: this section has been updated to correlate with the revised (herein) IFC Section 914.7 re detection and alarm systems.
- 411.5 : this section should have been omitted from Proposal G48-18, but it was mistakenly included and went unnoticed until it was too late to fix the mistake in the 2021 code. When the second exception was added to Section 411.1, this section was no longer needed.
- 411.6 (now 411.4): changes are intended as non-technical clarifications. Re. photoluminescent signs, the section required compliance with listing criteria, but didn't previously have a specific reference that required listed signs.
- 411.7 (now 411.5): changes are intended as non-technical clarifications.
- 411.6 (new): regulation of flammable decorative materials was previously included in this section, but Proposal G48-18 inadvertently omitted it when the provisions were re-written.

ICC Performance Code

- Updates and correlates the introductory text, which was originally copied from the former definition of "special amusement building." The proposed text is copied from the 2021 definition of "special amusement area" in the IBC and proposed herein for the IFC.

Cost Impact: The code change proposal will decrease the cost of construction
Most of the recommended changes are non-technical and simply improve usability of the code. However, the change that adds a new exception for puzzle rooms will reduce the code of construction for some of these uses by not requiring qualifying puzzle rooms to meet regulations for special amusement areas.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
907.2.12 Special amusement areas. Fire detection and alarm systems shall be provided in *special amusement areas* in accordance with Section 914.7 ~~914.7.2~~.

Committee Reason: The committee stated that the approval of the modification was based on the revision to the section reference that allows the reader to see the exceptions for the scoping. The reason for the approval of the proposal was stated that it correlates the intent by correcting the inadvertent errors by reorganizing the section so that it's coherent and it's easier for use and it is also in coordination with the action by the IBC General committee on Part I. (Vote: 14-0)

Final Hearing Results

G86-21 Part II	AM

G91-21

Original Proposal

IBC: [F] 415.11.1.1.2

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

[F] 415.11 Group H-5. In addition to the requirements set forth elsewhere in this code, Group H-5 shall comply with the provisions of Sections 415.11.1 through 415.11.12 and the *International Fire Code*.

Delete without substitution:

~~**[F] 415.11.1.1.2 Hazardous production materials.** The maximum quantities of hazardous production materials (HPM) stored in a single *fabrication area* shall not exceed the maximum allowable quantities per *control area* established by Table 307.1(1) and Table 307.1(2)~~.

Reason: Although this section of the IBC is under the jurisdiction of the Fire Code Committee, the section is not consistent with the IFC. A section equivalent to Section 415.11.1.1.2 does not exist in the IFC. As fabrication areas increase in size, the current Section 415.11.1.1.2 is overly restrictive and compliance becomes impractical. Furthermore, the section only applies when a facility is considered a Use Group H so applying the MAQ limits would not be appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This resolves a conflict between the IBC and IFC. If the IBC requirements are applied, the proposal has the impact of reducing the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal corrects an error dating back many editions of the codes. The fire code does not have limits based upon MAQs for fabrication areas but is instead addressed by Section 2705.2.2. There was some concern that this would allow excessive HPM in a fabrication area if IBC Section 415.11.1.1.2 is deleted. (Vote: 13-1)

Final Hearing Results

G91-21	AS

G93-21

Original Proposal

IBC: TABLE 414.5.1, TABLE 415.6.5; IFC: TABLE 911.1, TABLE 5003.8.2

Proponents: William Koffel, Koffel Associates, Inc., American Pyrotechnics Association (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[F] TABLE 414.5.1 EXPLOSION CONTROL REQUIREMENTS[a, h]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems[b]
HAZARD CATEGORY			
Combustible dusts[c]	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4[j]	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required
	Liquefied	Not Required	Required
Flammable liquid	IA[d]	Not Required	Required
	IB[e]	Not Required	Required
Organic peroxides	U	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2[g]	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system[i]	—	Not Required	Required
Energy storage system[i]	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist[f]	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the *International Fire Code*.

c. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.8.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the*International Fire Code*.

i. Where explosion control is required in Section 1207 of the*International Fire Code*.

j. Does not apply to consumer fireworks, 1.4G.

[F] TABLE 415.6.5 DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT SPECIFIED HEREIN			
Material	**Class**	**Solids and Liquids (tons)[a, b]**	**Gases (cubic feet)[a, b]**
Explosives	Division 1.1	Maximum Allowable Quantity	Not Applicable
	Division 1.2	Maximum Allowable Quantity	
	Division 1.3	Maximum Allowable Quantity	
	Division 1.4[e]	Maximum Allowable Quantity	
	Division 1.4[c, e]	1	
	Division 1.5	Maximum Allowable Quantity	
	Division 1.6	Maximum Allowable Quantity	
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3	1,200	Not Applicable
	Class 2	2,000	Not Applicable
Organic peroxides	Detonable	Maximum Allowable Quantity	Not Applicable
	Class I	Maximum Allowable Quantity	Not Applicable
	Class II	25	Not Applicable
	Class III	50	Not Applicable
Unstable (reactives) nondetonable	Class 3	1	2,000
	Class 2	25	10,000
Water reactives	Class 3	1	Not Applicable
	Class 2	25	Not Applicable
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 ton = 906 kg, 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of this code or Chapter 56 of the International Fire Code based on trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. “Maximum Allowable Quantity” means the maximum allowable quantity per control area set forth in Table 307.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) regulations or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, provided that the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required, for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown and is not manifolded upstream of pressure controls. Additionally, the gas supply is limited to cylinders that do not exceed 125 pounds (57 kg) water capacity in accordance with 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, 1.4G.

Reason: The proposal addresses an unanticipated consequence associated with Code Change F347-16
The 2015 Editions of the I-Codes contain the following definitions for “Fireworks, 1.4G” and for “Explosives, Division 1.4”:

Fireworks, 1.4G. *Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion. Such 1.4G fireworks which comply with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN0336, and the U.S. Consumer Product Safety Commission (CPSC) as set forth in CPSC 16 CFR: Parts 1500* *and 1507, are not explosive materials for the purpose of this code.*

Explosive, Division 1.4. *Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.*

While the IBC and IFC contain a definition for “Explosive”, there is a difference between the two definitions. Within the definition of “Explosive” in the 2018 Edition of the IBC, the following language continued to appear:

The term “explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G by the hazardous materials regulations of DOTn 49 CFR Parts 100-185.

Code Change F347-16 proposed several changes one of which was the deletion of “, are not explosive materials for the purpose of this code.” The submitter indicated that the change should have no impact as noted in the following portion of the Reason statement:

The change to Table 5603.1.1(1) is a change to reflect that consumer fireworks are indeed properly classified as an Explosive 1.4G and it’s not necessary to have a separate line with identical threshold values, including all footnotes, in order to determine at what point a building would be or should be classified as a Group H-3. It’s redundancy within the same table. In reality, at least at the model code level, other than the deletion of language saying consumer fireworks are not explosive, the net effect of the change to Table 5603.1.1(1) will be zero to what is taking place in the world of consumer fireworks manufacturing, storage, sale and use.
The cost analysis for the code change contains similar language that Code Change F347-16 should have no impact by stating:

Cost Impact: *Will not increase the cost of construction.*

The documentation associated with Code Change F347-16 indicated that the change would not impact the world of consumer fireworks. However, the two tables in the IBC are being applied to now require a detached building and explosion control for storage facilities containing consumer fireworks, 1.4G. Prior to the changes associated with F347-16 such protection was not required. There is on documentation indicating that storage facilities containing consumer fireworks, 1.4G need either explosion control or to be detached buildings.

Cost Impact: The code change proposal will decrease the cost of construction
Based on the way the 2021 Edition of the IBC is being interpreted, the cost of construction will be decreased. For those jurisdictions using the 2015 Edition, or earlier, of the IBC, there is no impact on the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it was considered a clean up. The revisions clarify the difference in requirements between other explosives and 1.4G fireworks. (Vote: 14-0)

Final Hearing Results

G93-21 AS

G94-21

Original Proposal

IBC: SECTION 202, 423.1, 423.3.1, 423.5.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Marc Levitan, NIST, ICC 500 Storm Shelter Standard Committee (marc.levitan@nist.gov)

2021 International Building Code

Revise as follows:

[BG] STORM SHELTER. A building, structure or portions thereof, constructed in accordance with ICC 500 and designated for use during ~~a severe wind storm event, such as a hurricane or tornado~~ hurricanes, tornadoes or other severe windstorms.

SECTION 423
STORM SHELTERS

Revise as follows:

423.1 General. This section applies to the design and construction of storm shelters constructed as separate detached buildings or constructed as rooms or spaces within buildings for the purpose of providing protection from ~~storms that produce high winds, such as~~ tornadoes, ~~and~~ hurricanes~~,~~ and other severe windstorms during the storm. This section specifies where *storm shelters* are required and provides requirements for the design and construction of *storm shelters*. Design of facilities for use as emergency shelters after the storm are outside the scope of ICC 500 and shall comply with Table 1604.5 as a *Risk Category* IV Structure.

423.3.1 Dedicated storm shelters. A facility designed to be occupied solely as a *storm shelter* shall be classified as Group A-3 for the determination of requirements other than those covered in ICC 500.

Exceptions:

1. The occupancy category for dedicated *storm shelters* with ~~an~~ a design *occupant* ~~*load*~~ capacity of ~~fewer~~ less than 50 persons as determined in accordance with ICC 500 shall be in accordance with Section 303.
2. The occupancy category for a dedicated residential *storm shelter* shall be the Group R occupancy served.

423.5.1 ~~Required~~ Design occupant capacity. The required design occupant capacity of the *storm shelter* shall include all of the buildings on the site and shall be the greater of the following:

1. The total *occupant load* of the classrooms, vocational rooms and offices in the Group E occupancy.
2. The *occupant load* of the largest indoor assembly space that is associated with the Group E occupancy.

   Exceptions:

   1. Where a new building is being added on an existing Group E site, and where the new building is not of sufficient size to accommodate the required design occupant capacity of the *storm shelter* for all of the buildings on the site, the storm shelter shall at a minimum accommodate the required occupant capacity for the new building.
   2. Where approved by the *building official,* the required design occupant capacity of the shelter shall be permitted to be reduced by the design occupant capacity of any existing *storm shelters* on the site.

Reason: ICC 500, a current reference standard in the IBC, IRC and IEBC, was recently updated to a 2020 edition for reference in the 2021 I-Codes. The new edition made some minor revisions to terminology differences that need to be reflected in the corresponding IBC Section 423 language. The key changes are as follows:

- Refer consistently to “tornadoes, hurricanes and other severe windstorms” to reflect that extratropical events are called hurricanes, typhoons or cyclones depending on region.
- Replace “occupant load” with design occupant capacity” to reflect ICC-500’s unique calculation of shelter capacity, which is different from the occupant load used in the IBC to size means of egress.
- Clarifying the term “community shelters” includes those shelters open to the general public, those open only to the occupants of the building served by the shelter, or both.

A corresponding proposal will be submitted in Group B to update Section R323 of the IRC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC 500 Development Committee.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The ICC 500 (Standard for the Design and Construction of Storm Shelters) development committee has held several virtual meetings during the last two years to develop the 202) edition. In addition, there were numerous virtual Working Group meetings. All meetings included members of the committee as well as interested parties. Related documents and reports are posted on the ICC 500 website at ICC 500.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The changes are editorial and necessary for correlation with ICC-500. They do not impact the way storm shelters are designed and constructed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it coordinates with the revised language in the 2020 ICC 500 Storm Shelter Standard. (Vote: 13-0)

Final Hearing Results

G94-21	AS

G95-21

Original Proposal

IBC: 423.4.1 (New)

Proponents: Benchmark Harris, National Storm Shelter Association, National Storm Shelter Association (bharris@huckabee-inc.com)

2021 International Building Code

423.4 Critical emergency operations. In areas where the shelter design wind speed for tornados in accordance with Figure 304.2(1) of ICC 500 is 250 mph, 911 call stations, emergency operation centers and fire, rescue, ambulance and police stations shall comply with Table 1604.5 as a *Risk Category* IV structure and shall be provided with a*storm shelter* constructed in accordance with ICC 500.

Add new text as follows:

423.4.1 Location. Storm shelters shall be located within the building they serve or shall be located where the maximum distance of travel from not fewer than one exterior door of each building to a door of the shelter serving that building does not exceed 1,000 feet (305 m).

Reason: There currently are no criteria limiting the travel distance to storm shelters for critical emergency operations facilities. Last code cycle, NSSA proposed that the travel distance provision be deleted entirely from the E occupancy requirements for storm shelters in the IBC but it was rejected. A similar motion was approved in the IEBC, though. The intent of this proposal is to apply the same travel distance requirements in the IBC to critical emergency operations center storm shelters as for E occupancy storm shelters. So, this proposal follows the requirements for travel distance of Group E occupancies.

Cost Impact: The code change proposal will increase the cost of construction
This will increase the cost of construction on some projects (where a campus has multiple buildings far apart) by requiring critical emergency operations centers have the same travel distance requirement that E occupancy areas do. In cases, this will require multiple storm shelters as it does for E occupancy facilities.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 423.4.1 Location. Storm shelters shall be located within the building they serve or shall be located where the maximum distance of travel from not fewer than one exterior door of each building to a door of the shelter serving that building does not exceed 1,000 feet (305 m), unless otherwise approved.

Committee Reason: The modification provided a middle ground between the 1,000 feet and a blanket exception that allows for a common sense decision from the code official. Since most facilities will not have a multi-building complex, they should be able to meet the 1,000 ft. travel distance most of the time. The proposal was approved as it provides the same travel distance as currently required for Group E buildings and is consistent with FEMA guidelines. (Vote: 9-5)

Final Hearing Results

G95-21	AM

G96-21

Original Proposal

IBC: 423.4.1 (New)

Proponents: Benchmark Harris, National Storm Shelter Association, National Storm Shelter Association (bharris@huckabee-inc.com)

2021 International Building Code

423.4 Critical emergency operations. In areas where the shelter design wind speed for tornados in accordance with Figure 304.2(1) of ICC 500 is 250 mph, 911 call stations, emergency operation centers and fire, rescue, ambulance and police stations shall comply with Table 1604.5 as a *Risk Category* IV structure and shall be provided with a*storm shelter* constructed in accordance with ICC 500.

Add new text as follows:

423.4.1 Required Occupant Capacity. The required occupant capacity of the storm shelter shall include all of the buildings on the site and shall be the greater of the following:

1. The total occupant load of offices.
2. The occupant load of the largest indoor assembly space.

Exceptions:

1. Where a new building is being added on an existing site, and where the new building is not of sufficient size to accommodate the required occupant capacity of the storm shelter for all of the buildings on the site, the storm shelter shall at a minimum accommodate the required occupant capacity of the new building.
2. Where approved by the building official, the required occupant capacity of the shelter shall be permitted to be reduced by the occupant capacity of any existing storm shelters on the site.

Reason: There are currently no minimum requirements for occupant capacity of a storm shelter for 911 call stations, emergency operation centers and fire, rescue, ambulance and police stations. This proposal follows the requirements for occupant load of Group E occupancies. This proposal would give a basis of design for storm shelters to set a minimum size standard for designers to start the design of the storm shelter.
NSSA submitted a change to the IBC last cycle that was rejected but would have eliminated the Assembly area criteria for E occupancy areas. A similar motion was approved at the IEBC, however. This change would provide consistency with the E occupancy area provisions in the IBC.

Cost Impact: The code change proposal will increase the cost of construction
This will increase the cost of construction because it will require storm shelters be designed for the largest indoor assembly area on a site. This could include a City Hall Assembly Area, for example, but this would make the provision consistent with the requirements for E occupancy areas, as the IBC requires schools design for the largest indoor assembly areas even if it's a large and open performing arts area open to the public, unrelated to education, with a capacity much larger than the largest expected student population on a regular school day.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 423.4.1 Required Occupant Capacity. The required occupant capacity of the storm shelter shall include all of the critical emergency operations ~~buildings~~ on the site and shall be ~~the greater of the following:~~

~~1.~~ The total occupant load of offices and number of beds.

~~2. The occupant load of the largest indoor assembly space~~.

Exceptions:

1. Where approved by the building official, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by occupant load calculation, shall be permitted to be used in the determination of the required design occupant capacity for the storm shelter.

~~1.~~2. Where a new building is being added on an existing site, and where the new building is not of sufficient size to accommodate the required occupant capacity of the storm shelter for all of the buildings on the site, the storm shelter shall at a minimum accommodate the required occupant capacity of the new building.

2.3. Where approved by the building official, the required occupant capacity of the shelter shall be permitted to be reduced by the occupant capacity of any existing storm shelters on the site.

Committee Reason: The modification to the main paragraph of Section 423.4.1 better described the number of occupants anticipated in these types of facilities that the shelter is intended to serve. The modification to add the new Exception 1 is logical and is consistent with a similar allowance for consideration of actual occupant load in Section 1004.5. The proposal was approved as this provides needed guidance for the size of storm shelters required in critical emergency operation facilities. (Vote: 14-0)

Final Hearing Results

G96-21	AM

G97-21

Original Proposal

IBC: 423.5.1

Proponents: CRAIG MCKEE, Huckabee, INC, Huckabee, Inc (cmckee@huckabee-inc.com)

2021 International Building Code

Revise as follows:

423.5.1 Required occupant capacity. The required occupant capacity of the *storm shelter* shall include all of the buildings on the site and shall be the ~~greater of the following:~~

~~1. The~~ total *occupant load* of the classrooms, vocational rooms and offices in the Group E occupancy.

~~2. The *occupant load* of the largest indoor assembly space that is associated with the Group E occupancy~~.

Exceptions:

1. Where a new building is being added on an existing Group E site, and where the new building is not of sufficient size to accommodate the required occupant capacity of the *storm shelter* for all of the buildings on the site, the storm shelter shall at a minimum accommodate the required occupant capacity for the new building.
2. Where approved by the *building official,* the required occupant capacity of the shelter shall be permitted to be reduced by the occupant capacity of any existing *storm shelters* on the site.

Reason: For the same reason that the code does not require shelters for the entire population that outdoor venues can accommodate, such as outdoor football fields, it should not be necessary for schools to increase the size of the shelters for criteria 2. It is common for schools to share sites with other buildings that have indoor assembly areas that many building officials conservatively consider to be associated with a Group E occupancy. These assembly areas are often on the same site as the school and are sometimes even used by students during the school day, but these assembly areas do not add to the normal population of students in school and the staff that are associated with those students. Many school communities can understand and support the unfunded mandate in tornado prone areas that schools bear the cost of providing tornado shelters for minors that are required by law to be in the care of a school and those adult individuals taking care of them, out of an elevated obligation that comes with having school be mandatory for minors in our country. However, it is inappropriate to require that school systems bear the cost of sheltering possible occupants from the public at these areas. The population for criteria 2 can be significantly larger than criteria 1 when there are large assembly spaces on the site such as a public library (e.g. when a public library operates on a school campus and also functions as the school library), indoor football field, performing arts center, equestrian arena, natatorium, competition basketball arena, and/or professional development center.
The additional people in question (above and beyond criteria 1) elect to be in those assembly areas (as adults, or as minors before or after normal school hours at the permission of their parents/guardians), just like they do in any commercial or other public assembly area. If ICC believed that the public in all assembly areas needed to be sheltered because the tornado hazards are that significant in those areas, then those types of businesses should be required to build tornado shelters too. The current code places an inequitable financial burden on school districts. More importantly, though, the additional area of shelter will most likely never be used.

Yes, if a tornado with windspeeds greater than the main building was designed to withstand happens to occur at the exact moment that there is an assembly with more people than the criteria 1 population, the additional area of the shelter could be used. However, there is a very low probability of this occurring and, other than this occurrence, the additional area of shelter would typically never be used because school districts that are constructing code-required shelters (not FEMA funded safe rooms) typically have no intention of ever opening their tornado shelters up to the general public because of the many operational challenges (e.g. concern with overcrowding above the shelter capacity) and increased liability.

This issue is further complicated by the fact that Section 432.5.2 requires storm shelters be within 1,000 feet of the buildings they serve. Many high school campuses have buildings with Assembly functions (that building officials conservatively consider to be associated with an E occupancy) greater than 1,000 feet from the school building. The code is not clear whether these assembly areas require their own tornado shelter. Removing criteria 2 would resolve this dilemma by clearly identifying that the occupant load of the classrooms, vocational areas and offices are the areas that need to be served with tornado shelters.

The rationale to remove criteria 2 applies to new campuses as well as existing campuses; however, it is especially applicable for new buildings on existing campuses where options to provide a tornado shelter are much more limited because the existing buildings were not laid out with a future tornado shelter in mind.

The following is an example:

There is an existing performing arts center on a 100 Acre site, with the two buildings more than 1,000 feet apart, and the 2021 IBC is in effect. The school system proposes a new academic building with a criteria 1 population of 2,000. The criteria 1 population of the performing arts center is 0. The Building Official considers the performing arts center to be an A that is associated with an E occupancy. There are moveable partitions in the performing arts center that allow all of the rooms (except for the lobby) to open up into one large performing arena for 5,000 people in seats and up to 500 people on stage, making the criteria 2 population (the largest indoor assembly area associated with the E occupancy on the site) 5,500 people. The school system is required to build a shelter for at least 5,500 people because the floor plan area of the proposed addition to the academy could accommodate 5,500 people if the entire addition was one large tornado shelter. If the two buildings were closer than 1,000 feet, the 2021 IBC criteria 2 would require $10 Million of sheltering ($5.6 Million for the 2,000 people in a multi-purpose shelter and $4.4 Million for 3,500 people in a dedicated, single-use shelter). This means that even in the 1,000 feet proximity rule was not in effect, this school system would need to spend $4.4 Million on sheltering the additional population that could be in a performing arts center. However, because the buildings are more than 1,000 feet apart, the actual cost impact of criteria 2 is much greater at this campus because 2 separate shelters are required to accommodate the travel distance requirement. 2021 IBC section 432.5.2 requires that the shelters be located within 1,000 feet of the “population they serve” and these two buildings are more than 1,000 feet apart. Therefore, the code requires that a 5,500 person shelter be constructed as a new addition to the performing arts center to accommodate that population and a 2,000 person shelter be constructed as part of the proposed academic building. The combined cost of these two shelters would be $12.5 Million ($5.6 Million for the 2,000 people in the multi-purpose shelter by the academy and $6.9 Million for 5,500 people in a dedicated, single-use shelter by the performing arts center). Without criteria 2, only a $5.6 Million shelter would be required for the 2,000 occupants associated with criteria 1 on the entire campus.

Cost Impact: The code change proposal will decrease the cost of construction
There will be a decrease in the cost for storm shelters for new school buildings on existing campuses that have associated assembly spaces larger than the student population.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
423.5.1 Required occupant capacity. The required occupant capacity of the *storm shelter* shall include all of the buildings on the site and shall be the total occupant load of the classrooms, vocational rooms and offices in the Group E occupancy.
Exceptions:

1. Where approved by the building official, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by occupant load calculation, shall be permitted to be used in the determination of the required design occupant capacity for the storm shelter.

~~1~~2. Where a new building is being added on an existing Group E site, and where the new building is not of sufficient size to accommodate the required occupant capacity of the *storm shelter* for all of the buildings on the site, the storm shelter shall at a minimum accommodate the required occupant capacity for the new building.

~~2~~3. Where approved by the *building official,* the required occupant capacity of the shelter shall be permitted to be reduced by the occupant capacity of any existing *storm shelters* on the site.

Committee Reason: The modification to add the new Exception 1 is logical and is consistent with a similar allowance for consideration of actual occupant load in Section 1004.5, This would be consistent with the committee action in G96. The proposal was approved as this provides needed guidance for the size of storm shelters required for the students and staff in the school. The associated assembly spaces will not be occupied at the same time. The amount of time the public will be in assembly space in a school building is limited, is not typically fully occupied when school is in operation, or may have a much higher occupant load than the students and staff, therefore the elimination of the assembly space for sizing criteria is appropriate. (Vote: 14-0)

Final Hearing Results

G97-21	AM

G99-21 Part I

Original Proposal

PART I - IBC: SECTION 202 (New)
PART II - IBC: SECTION 429 (New), NFPA Chapter 35 (New)
PART III - IBC:306.3
PART IV - IBC:311.3
PART V - IBC:TABLE 509.1
PART VI - IBC:TABLE 1004.5, 1004.8 (IFC[BE] TABLE 1004.5, 1004.8)
PART VII - IBC:1010.2.9.1(IFC[BE] 1010.2.9.1)
PART VIII - IFC: SECTION 202 (New)
PART IX- IFC: SETION 608.9.1
PART X - IMC: SECTION 202 (New)
PART XI - IMC: 1103.2
PART XII - IMC: 1104.2.3 (New)

Proponents: Greg Johnson, Johnson & Associates Consulting Services, Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, Codes and Standards International, Vertiv (peters.jay@me.com); Andrew Klein, A S Klein Engineering, Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, Target Corporation (barry.greive@target.com); David Collins, The Preview Group, Inc., The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

THIS IS A 12 PART CODE CHANGE. PART I THROUGH V WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART VI AND VII WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART VIII AND IX WILL BE HEARD BY THE FIRE CODE COMMITTEE.PART X AND XII WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

COMPUTER ROOM

.
A room or portions of a *building* used primarily to house *information technology equipment* (ITE) and serving an ITE load less than or equal to10 kW or 20 W/ft^2 (215 W/m^2) or less of conditioned floor area.

DATA CENTER

.
A room or *building*, or portions thereof, used primarily to house *information technology equipment* (ITE) and serving a total ITE load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.

INFORMATION TECHNOLOGY EQUIPMENT (ITE)

.
Computers, data storage, servers, and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF)

.
Data centers and *computer rooms* used primarily to house *information technology equipment*.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4*Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the*ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and wate.r*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single

independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.

- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019*Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because these definitions are an important part of the package for these types of facilities. There was concerned raised about the differences between the four definitions and that there were requirements in the definitions - this could be simplified. (Vote: 8-5)

Final Hearing Results

G99-21 Part I	AS

G99-21 Part VI

Original Proposal

PART VI - IBC:TABLE 1004.5, 1004.8 (IFC[BE] TABLE 1004.5, 1004.8)

Proponents: Greg Johnson, Johnson & Associates Consulting Services, Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, Codes and Standards International, Vertiv (peters.jay@me.com); Andrew Klein, A S Klein Engineering, Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, Target Corporation (barry.greive@target.com); David Collins, The Preview Group, Inc., The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

Portions of table not shown remain unchanged.

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Business areas	150 gross
Information Technology Equipment Facilities	300 gross
Concentrated business use areas	See Section 1004.8

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

1004.8 Concentrated business use areas. The*occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data ~~processing~~entry centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where approved by the *building official*, the *occupant load* for concentrated business use areas shall be the actual *occupant load*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the roo

- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4*Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and wate.r*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under abnormal operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical

equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.

- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

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The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019*Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
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PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
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PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.

PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Business areas	150 gross
~~*Information Technology Equipment Facilities*~~	~~300 gross~~
Concentrated business use areas	See Section 1004.8
Information Technology Equipment Facilities	300 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Committee Reason: The modification moved Information Technology Equipment Facilities out from under business, which is a more appropriate location. The proposal was approved as it separated data entry from equipment facilities. The coordinates with the action on G99-21 Part 1. (Vote: 14-0)

Final Hearing Results

G99-21 Part VI AM

G99-21 Part VIII

Original Proposal

PART VIII - IFC: SECTION 202 (New)

Proponents: Greg Johnson, Johnson & Associates Consulting Services, Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, Codes and Standards International, Vertiv (peters.jay@me.com); Andrew Klein, A S Klein Engineering, Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, Target Corporation (barry.greive@target.com); David Collins, The Preview Group, Inc., The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Fire Code

Add new definition as follows:

COMPUTER ROOM

.
A room or portions of a *building* used primarily to house *information technology equipment (ITE)* and serving an *ITE* load less than or equal to10 kW or 20 W/ft2 (215 W/m2) or less of conditioned floor area.

DATA CENTER

.
A room or *building*, or portions thereof, used primarily to house *information technology equipment (ITE)* and serving a total *ITE* load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.

INFORMATION TECHNOLOGY EQUIPMENT (ITE)

.
Computers, data storage, servers, and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF)

.
Data centers and *computer rooms* used primarily to house *information technology equipment*.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4*Energy*

Standard for Data Centers as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the*ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE*.*"

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and wate.r*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.

- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is

provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.

- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019*Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific. PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved to be consistent with Part I. Additionally if the other portions are placed within the code these definitions will be critical. It was noted that NFPA 75 does not appear to be consistent with these definitions. (Vote: 10-4)

Final Hearing Results

G99-21 Part VIII AS

G105-21

Original Proposal

IBC: 503.1.4.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

503.1.4.1 Enclosures over occupied roof areas. Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

~~**Exception:**~~ **Exceptions:**

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. Required guards shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the level of fire department vehicle access.

Reason: The limit on the guard height was based on fire department access to the roof. Once the roof deck is higher than fire ladder access, this is no longer justification for this limitation. There has been concerns that higher guards are needed on higher roofs to prevent people from jumping off the roof deck and/or to allow for wind breaks to limit items blowing off the roof deck and falling on people below.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This allows additional design options for guards around roof decks.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted. The proposal will allow for what is currently done. The committee recommend the section title be reviewed to read "enclosures around and over roof areas" to better match the provision. (Vote: 9-5)

Public Comments

Public Comment 2

Proponents: Jonathan Siu, Self, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

503.1.4.1 Enclosures over occupied roof areas . Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

Exceptions:

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. Required guards shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Commenter's Reason: We agree with the intent of this proposal, that in tall buildings, the 48" limitation is not necessary. However, we believe the originally proposed text is ambiguous. What fire department access is used to determine the 75' threshold? We believe it is much clearer to tie it to the trigger for high rise buildings, which uses lowest fire department vehicle access as the datum. Note that because of other proposals in this cycle that may change the definition of high rise buildings as related to occupied/occupiable roofs, we have not proposed to refer directly to high rise buildings.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The public comment does not change the original cost impact statement: "This allows additional design options for guards around roof decks."

Public Comment 3

Proponents: Jonathan Siu, Self; Lee Kranz, City of Bellevue Washington, Myself (lkranz@bellevuewa.gov); Micah Chappell, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

503.1.4.1 Enclosures over occupied roof areas . Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

Exceptions:

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. ~~Required guards~~ Elements or structures enclosing the occupied roof areas shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the level of fire department vehicle access.

Commenter's Reason: The proposed Exception 2 to Section 503.1.4.1 takes an important step forward, but does not go far enough. As written, the new exception only applies to "required guards." This public comment would expand the application of the exception to any element or structure that encloses the occupied roof.
The reason statement for the original proposal states there is no justification for the restriction on guard heights once the roof deck is higher than fire ladder access. We agree. However, the current (2021) code text is not just about guards, and even the reason statement refers to items that are not "required guards." The language in Section 503.1.4.1 was deliberately crafted to be broad, so it would encompass any elements that might extend upward at the perimeter of the roof such as walls, parapets, rooftop structures (some of which are exempted in Exception 1), and wind screens ("wind breaks" in the reason statement).

This public comment would allow any of these elements or structures to extend above the roof level, once the occupied roof is above fire department ladder reach.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The original proposal stated this will not change the cost of construction. This public comment does not change that.

Final Hearing Results

G105-21	AMPC2,3

G106-21 Part II

Original Proposal

PART II - IBC: 1015.2 (IFC[BE] 1015.2)

Proponents: Lee Kranz, City of Bellevue Washington, Myself (lkranz@bellevuewa.gov)

2021 International Building Code

Revise as follows:

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. <u>*Guards* shall be provided at the perimeter of the occupied portions of an occupied roof.</u> *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.

Reason: This code change is needed to protect children. There are many cases where the design of an occupied roof includes only a portion of the entire roof area. The occupied portions of the roof are typically elevated 18" or less above the adjacent unoccupied areas of the roof, therefor no guard is currently required per Section 1015.2. This issue is regularly debated on building official chat lines and other forums due to the lack of regulatory authority to require the guard in this design scenario. Even the idea of a small child falling to their death because they bolted from a parent or guardian to look over the edge of a roof is unthinkable. Occupied roofs are relatively new in the IBC and we're discovering issues related to their design on a regular basis. This code change will eliminate or drastically reduce the potential for kids, or even adults who may be inebriated, from falling over the edge of a roof which even if the occupied portion of the roof is some distance away from the roof edge.
Adding a new Section 503.1.4.2 Guards, will insure that the reader will go to Section 1015.2 to see that guards are required. Examples of this can be found in Sections 406.4.1, 505.3.3 and 1029.17.

Cost Impact: The code change proposal will increase the cost of construction
The cost to construct some occupied roofs where the edge of the occupied portion of the occupied roof is inboard of the roof edge will go up due to the installation of guards.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved for several reasons. There are issues with structural attachment if the guard is not on the edge of the roof. There are a lot of barriers that would work to stop people from moving out of the areas intended to be occupied. There are no fall issues, so a guard is not needed. This is an issue to prevent access, not a fall issue. This requirement is an over reach. (Vote: 11-3)

Public Comments

Public Comment 1

Proponents: Lee Kranz, City of Bellevue, WA, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.2 Where required . *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, ~~. *Guards* shall be provided~~ and at the perimeter of ~~the occupied portions of an~~ occupied roofs. ~~roof.~~ *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portionsof an occupied roof located less than 30 inches measured vertically to adjacent unoccupied roof areas where approved guards are present at the perimeter of the roof.
10. At portionsof an occupied roof where an *approved* barrier is provided.

Commenter's Reason: Clarification is needed in the code to inform design professionals and building officials when a *guard* or barrier is required for occupied roofs where the occupied roof deck is less than 30" above the adjoining unoccupied roof areas. There are many cases where the design of an occupied roof includes only a portion of the entire roof area. Occupied portions of the roof are typically elevated 18" or less above the adjacent unoccupied areas of the roof, therefor, no *guard* is currently required for these areas per Section 1015.2 which means that a child or an adult could wander over to the edge of the roof and fall off. This issue is regularly debated on building official chat lines and other forums due to the lack of regulatory authority to require the *guard* in this design scenario.
To address the constructive comments made at the Committee Action Hearings we have made the following changes:

- Instead of having a separate sentence to add the need for guards at the perimeter of the occupied roofs, the scoping has been added to the end of the laundry list for where guards are required. This creates continuity for the scoping and provides better clarity for the reader. Because the new scoping comes after the 30 inch change in elevation language in Section 1015.2, guards will typically be required at the perimeter of occupied roofs.

Exceptions 9 and 10 have been added in this Public Comment to address concerns expressed at the Committee Action Hearings.

- Exception 9 exempts the need for *guards* between the occupied and unoccupied roof areas if the entire roof perimeter is provided with a *guard*. In this scenario, safety is ensured even if occupants wander over to the edge roof.

- Exception 10 allows the building official to approve the use of a barrier when the need for a full Chapter 16 compliant*guard* is not warranted. In these cases, an approved barrier may be provided instead of a *guard*.

Occupied roofs are relatively new in the IBC and we're discovering new issues such as this related to their design. This code change will eliminate or drastically reduce the potential for kids, or even adults who may be inebriated, from falling over the edge of a roof, even if the occupied portion of the roof is some distance away from the roof edge.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
This code change will add cost because there will be a need for more guardrail installations on occupied roofs. There are most likely many occupied roofs that, under the current code, would not require a guard; this code change will change that to require a guard or barrier for most partial roof area occupied roofs at the perimeter of the occupied roof.

Final Hearing Results

G106-21 Part II	AMPC1

G112-21 Part I

Original Proposal

PART I - IBC: SECTION 202 (New), SECTION 506 (New)
PART II - IBC:1011.14, 1015.2, 1015.3 (IFC[BE]1011.14, 1015.2, 1015.3)
PART III - IFC: 907.2.11.1, 907.2.11.2 (IBC:[F] 907.2.11.1, [F] 907.2.11.2)

Proponents: Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov); Jonathan Siu, Self, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART III WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

EGRESS ROOF ACCESS WINDOW

.
A skylight or roof window designed and installed to satisfy the emergency escape and rescue opening requirements of Section 1031.

SLEEPING LOFT

.
A sleeping space on a floor level located more than 30 inches (762 mm) above the main floor and open to the main floor on one or more sides with a ceiling height of less than 6 feet 8 inches (2032 mm).

LANDING PLATFORM

.
A landing provided as the top step of a stairway accessing a sleeping loft.

Add new text as follows:

SECTION 506
SLEEPING LOFT

506.1 General. *Sleeping lofts* shall comply with Sections 506.1 through 506.5.

506.2 Sleeping loft area and dimensions. Sleeping lofts shall meet the minimum area and dimension requirements of Sections 506.2.1 through 506.2.3. A s*leeping loft* or *sleeping lofts* in compliance with Section 506.2 shall be considered a portion of the story below. Such *sleeping lofts* shall not contribute to either the building area or number of stories as regulated by Section 503.1. The area of the*sleeping loft* shall be included in determining the *fire area*.

506.2.1 Area. *Sleeping lofts* shall have a floor area of not less than 35 square feet (3.25 m^2) and less than 70 square feet (6.5 m^2).

506.2.2 Minimum horizontal dimensions. *Sleeping lofts* shall be not less than 5 feet (1524 mm) in any horizontal dimension.

506.2.3 Height effect on sleeping loft area. Portions of a *sleeping loft* with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft but shall contribute to the maximum allowable area.

Exception: Under gable roofs with a minimum slope of 6 units vertical in 12 units horizontal (50-percent slope), portions of a sleeping loft with a sloped ceiling measuring less than 16 inches (406 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the sleeping loft but shall contribute to the maximum allowable area.

506.3 Sleeping loft access and egress. The access to and primary egress from sleeping lofts shall be of any type described in Sections 506.3.1 through 506.3.5 and shall meet the sleeping loft where the sleeping loft's ceiling height is not less than 3 feet (914 mm) along the entire width of the access and egress component.

506.3.1 Stairways. Stairways accessing sleeping lofts shall comply with Sections 506.3.1.1 through 506.3.1.7.

506.3.1.1 Headroom. The headroom above the sleeping loft access and egress shall be not less than 6 feet 2 inches (1880 mm), as measured vertically, from a sloped line connecting the tread, landing, or landing platform nosing's in the center of their width, and vertically from the landing or landing platform along the center of its width.

506.3.1.2 Width. Stairways accessing a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

506.3.1.3 Treads and risers. Risers for stairs accessing a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

506.3.1.4 Landings. Intermediate landings and landings at the bottom of stairways shall comply with Section 1011.6, except that the depth in the direction of travel shall be not less than 24 inches (508 mm).

506.3.1.5 Landing platforms. The top tread and riser of *stairways* accessing *sleeping lofts* shall be constructed as a *landing platform* where the loft ceiling height is less than 6 feet 2 inches (1880 mm) where the stairway meets the *sleeping loft*. The *landing platform* shall be not less than 18 inches (508 mm) in width and in depth measured horizontally from and perpendicular to the nosing of the *landing platform*. The *landing platform* riser height to the edge of the *sleeping loft* floor, shall not be greater than 18 inches (508 mm) in height.

506.3.1.6 Handrails. *Handrails* shall comply with Section 1011.11.

506.3.1.7 Stairway guards. *Guards* at open sides of *stairways*, *landings*, and *landing platforms* shall comply with Section 1115.

506.3.2 Ladders. Ladders accessing sleeping lofts shall comply with Sections 506.3.2.1 and 506.3.2.2.

506.3.2.1 Size and capacity. Ladders accessing sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

506.3.2.2 Incline. Ladders shall be installed at 70 to 80 degrees from horizontal.

506.3.3 Alternating tread devices. *Alternating tread devices* accessing *sleeping lofts* shall comply with Section 1011.14. The clear width at and below the handrails shall be not less than 20 inches (508 mm).

506.3.4 Ships ladders. Ships ladders accessing sleeping lofts shall comply with Sections 1011.15. The clear width at and below handrails shall be not less than 20 inches (508 mm).

506.4 Sleeping Loft Guards. Guards shall be located along open sides of sleeping lofts that are located more than 30 inches (762 mm) measured vertically to the floor below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Sleeping loft guards shall be constructed in accordance with Section 1015.

506.5 Emergency escape and rescue openings. *An emergency escape and rescue opening* shall be located in each *sleeping loft.*

Exception: Sleeping lofts where an egress roof access window is provided complying with Section 1031.3.

Reason: This proposal takes an important part of the Residential Code Appendix Q outlining the design criteria for a loft, modifies some of the requirements, and then incorporates it into the main sections of the IBC with definitions and a new section. This proposal provides allowances and limitations on designed spaces specifically identified as a sleeping loft, while clearly differentiating these small spaces from mezzanines and other habitable space.
The proposal requires these small spaces to include smoke detection and an emergency escape and rescue opening. A sleeping loft in an IBC dwelling unit would provide the equivalent safety standards as a loft located in a small dwelling unit as currently allowed in IRC Appendix Q. Expanding the availability of sleeping lofts will promote more broad uses of space, while possibly allowing for an increase in housing density and affordability.

Most of the technical provisions are taken from IRC Appendix Q. However, the list below explains the differences between this proposal and Appendix Q, and our rationale.

- "sleeping loft" vs "loft" – we want to trigger smoke alarm, emergency escape/rescue opening.
- 506.2.1: Imposes max. 70 sf area. Intent is to keep these small, without being able to circumvent minimum habitable space requirements for larger rooms. Thus, beyond 70 sf, space should meet full interior dimension requirements for habitable space (IBC 1208) and mezzanines (IBC 505)
- 506.3: Requires 3' ceiling height at access/egress component. Stair requires 6'2" headroom, but ladders, alternating tread devices, and ships ladders have no similar requirement. Ceiling heights of less than 3' are allowed, and nothing states that the ladders, etc. can't be placed in those lower-ceiling areas. Some minimum height above the device is necessary to allow people in the sleeping loft to egress in an emergency.
- 506.3.1.5: Allows 18" landing platforms, vs "18 to 22 inches" in direction of travel in Appendix Q. Picked lower limit, since Appendix Q doesn't say when to use anything larger. Allows 18" rise from landing platform to loft floor, where Appendix Q allows 16 to 18 inches. In this case, picked 18" as the maximum, again, because there is no other guidance in Appendix Q why something smaller might be required.
- 506.3.2.1: Requires ladders be capable of supporting 300 pound load on any rung, vs 200 in Appendix Q. 300 is consistent with load requirements in IBC Chapter 16.

The change to 1011.14 is for coordination with the new Section 506.3.3. In order to add to the list of allowed uses, there was a need to clarify whether alternating tread devices are allowed to provide access to unoccupied roofs to other than I-3 occupancies. Numbering the list is for clarity, taking the place of a long sentence with clauses separated by semicolons, and also clearly allows these for unoccupied roof access in other occupancies besides I-3s, consistent with the IBC Commentary. The change to 1015.2 and the new Exception 4 in 1015.3 integrate the sleeping loft guard provisions from IRC Appendix Q Section AQ104.2.5 into the guard provisions of the IBC, instead of having them reside in the sleeping loft section."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the new sections to the code add an option and not a requirement. When and applicant decides to utilize these new sections, the code provides guidance on minimum standards for that space.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved. The committee had several concerns, including appropriate location in the code. Confusion between mezzanine and/or sleeping loft. There is no defined height. The proposal had no scoping. The committee expressed concerns about guards. (Vote: 12-1)

Public Comments

Public Comment 2

Proponents: Sue Coffman, City of Tacoma, City of Tacoma (sue.coffman@cityoftacoma.org); Ardel Jala, City of Seattle, Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov); Hoyt Jeter, City of Tacoma, City of Tacoma (hjeter@cityoftacoma.org); Quyen Thai, City of Tacoma, City of Tacoma (qthai76@gmail.com) requests As Modified by Public Comment

Replace as follows:

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APPENDIX P SLEEPING LOFTS

SECTION P101 GENERAL .

P101.1 General . Where provided in Group R occupancies,sleeping lofts shall comply with the provisions of this code, except as modified by this appendix. Sleeping lofts constructed in compliance with this appendix shall be considered a portion of the story below. Such sleeping lofts shall not contribute to either the building area or number of stories as regulated by Section 503.1. The sleeping loft floor area shall be included in determining the fire area.
The following sleeping lofts are exempt from compliance with this appendix:

1. Sleeping lofts with a maximum depth of less than 3 feet (914 mm).
2. Sleeping lofts with a floor area of less than 35 square feet (3.3 m^2).
3. Sleeping lofts not provided with a permanent means of egress.

P101.2 Sleeping loft limitations . Sleeping lofts shall comply with the following:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m^2).
2. The sleeping loft ceiling height shall not exceed 7 feet (2134 mm) for more than one half of the sleeping loft floor area.

The provisions of this appendix shall not apply to sleeping lofts that do not comply with Items 1 and 2.

P101.3 Sleeping loft ceiling height . The clear height below the sleeping loft floor construction shall not be less than 7 feet (2134 mm). The ceiling height above the finished floor of the sleeping loft shall not be less than 3 feet (914 mm). Portions of the sleeping loft with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not contribute to the sleeping loft floor area.

P101.4 Sleeping loft area . The aggregate area of all sleeping lofts and mezzanines within a room shall comply with Section 505.2.1.

Exception: The area of a single sleeping loft shall not be greater than two-thirds of the area of the room in which it is located, provided that no other sleeping lofts or mezzanines are open to the room in which the sleeping loft is located.

SECTION P102 DEFINITIONS .

P102.1 General . The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.
SLEEPING LOFT. A space on an intermediate level or levels between the floor and ceiling of a Group R occupancy dwelling or sleeping unit, open on one or more sides to the room in which the sleeping loft is located.

SECTION P103 MEANS OF EGRESS .

P103.1 General . Where a permanent means of egress is provided for sleeping lofts, the means of egress shall comply with Chapter 10 of this code, as modified by Sections P103.2 through P103.6.

P103.2 Ceiling height at sleeping loft means of egress . A minimum ceiling height of 3 feet (914 mm) shall be provided for the entire width of the means of egress from the sleeping loft.

P103.3 Stairways . Stairways providing egress from sleeping lofts shall be permitted to comply with Sections P103.3.1 through P103.3.3.

P103.3.1 Width . Stairways providing egress from a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

P103.3.2 Treads and risers . Risers for stairs providing egress from a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

P103.3.3 Landings . Landings at stairways providing egress from sleeping lofts shall comply with Section 1011.6, except that the depth of landings in the direction of travel shall be not less than 24 inches (508 mm).

P103.4 Alternating tread devices . Alternating tread devices shall be permitted as a means of egress from sleeping lofts, where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room to which it is open. Handrails and treads of such alternating tread devices shall comply with Section 1011.14.

P103.5 Ship's ladders . Ship's ladders shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room to which it is open. Handrails and treads of such ship's ladders shall comply with Section 1011.15.

P103.6 Ladders . Ladders shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room to which it is open. Such ladders shall comply with Sections P103.6.1 and P103.6.2.

P103.6.1 Size and capacity . Ladders providing egress from sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

P103.6.2 Incline . Ladders shall be inclined at 70 to 80 degrees from horizontal.

SECTION P104 GUARDS .

P104.1 General . Guards complying with Section 1015 of this code shall be provided at the open sides of sleeping lofts.

> **Exception:** The guard height at sleeping lofts shall be permitted to be 36 inches (914 mm) where the ceiling height of the sleeping loft is 42 inches (1067 mm) or less.

SECTION P105 SMOKE ALARMS .

P105.1 General . Listed single- or multiple-station smoke alarms complying with UL 217 shall be installed in all sleeping lofts.

Commenter's Reason: This public comment fully replaces G112-21 Parts I, II, and III, and places the proposed sleeping loft provisions from G112-21 Parts I, II, and III into a new appendix, where a jurisdiction has the option to adopt them. While sleeping lofts are a prevalent and important enough issue to warrant placement in the body of the code, this appendix is being offered in response to comments from some Committee members and some opponents.

The provisions of the appendix were modified from the original proposal in response to comments we received from the Committees and opposing testimony, and in collaboration with some of the opponents. A general description of the changes made to the original provisions follows.

Sleeping loft scoping and general provisions:

Even if the appendix is adopted by a jurisdiction, application of the appendix is an option ("Where provided…," P101.1). It will be up to the designer to decide whether or not to designate these areas as sleeping lofts.

- Sleeping lofts are limited to dwelling units or sleeping units in R occupancies (P101.1, P102.1).
- Sleeping lofts are required to comply with the base code, except where the provisions of the appendix modify them (P101.1).
- Small spaces that might technically meet the definition of a sleeping loft or sleeping loft-like spaces that don't have a permanent means of egress are exempt from the requirements of the appendix (P101.1).
- Once a sleeping loft is provided with dimensions that are equivalent to "normal" residential living spaces, it must comply with the full provisions for egress, habitable space, etc. (P101.2).
- The requirement for 7 feet below the sleeping loft was added in response to a comment received from a Committee member (P101.3). The text is drawn from IBC 505.2 regarding clear height below mezzanines. We actually don't see an issue with having smaller, usable spaces below sleeping lofts (what about a storage closet?) but the 7-foot requirement also reflects what we have seen in real-world project proposals, where these are generally placed on top of bathrooms in microhousing. See Figure 1 below, which is an example of a real-life (constructed) sleeping loft, taken from the article, "What you need to know about NYC apartments with sleeping lofts" posted on www.brickunderground.com.

Figure 1: Example of constructed sleeping loft

Sleeping loft vs mezzanine:

During testimony, the question was raised as to how sleeping lofts are the same as or different from mezzanines. We also received conflicting comments as to whether these provisions belonged in the mezzanine provisions or in its own section. We believe it is more understandable to keep sleeping lofts separate. We have clarified that the aggregate area of all sleeping lofts plus any mezzanines must meet the area limitations of mezzanines (P101.4). However, the exception in P101.4 allows a very small dwelling or sleeping unit, which can be as small as 70 square feet of habitable space (think microhousing), to have a single sleeping loft that can be up to two-thirds of the area of the main room. This is based on the allowance for mezzanines and equipment platforms in IBC 505.2.1.1.

Sleeping loft egress and guards:

In general, means of egress (including individual components) and guards must comply with the base code, but the specific provisions in P103 and the exception in P104.1 modify Chapter 10 (P103.1, P104.1). Changes from the original proposal include:

- Allowing the use of alternating tread devices, ship's ladders, and ladders as a means of egress, but limiting their height (P103.4, P103.5, P103.6). We received a comment after the CAH expressing concern about having small children only having a ladder for a means of egress from an unlimited height. The 10-foot limitation is consistent with the 7-foot clear height requirement in P101.3, and would also allow for floor framing and a full-height space below the sleeping loft.

- Guards at sleeping lofts must fully comply with Section 1015 (P104.1), but the exception allows a shorter guard in sleeping lofts with lower ceiling heights. Based on comments we received after the CAH, a 36-inch guard is only allowed where a 42-inch guard would not fit.

Housing affordability has become increasingly important in recent years due to the impacts of recessions and COVID. This proposal allows for densification of multi-family residential housing by providing an option for additional sleeping space within the same building footprint. The proposed provisions are especially important for increasing usable space in very small units, which have been increasingly popular with the importance of sustainability and living more simply. Not only would this allow more living space within a new multifamily building, but it also encourages the alteration of existing dwelling and sleeping units rather than demolition and new construction.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the appendix adds an option and not a requirement. When a jurisdiction adopts the appendix and an applicant decides to utilize these new provisions, the code will provide guidance on minimum standards for that space.

Final Hearing Results

G112-21 Part I	AMPC2

G116-21

Original Proposal

IBC: 506.3.2, TABLE 506.3.3, 506.3.3.1

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

506.3 Frontage increase. Every building shall adjoin or have access to a *public way* to receive an area factor increase based on frontage. Area factor increase shall be determined in accordance with Sections 506.3.1 through 506.3.3.

506.3.1 Minimum percentage of perimeter. To qualify for an area factor increase based on frontage, a building shall have not less than 25 percent of its perimeter on a *public way* or open space. Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved *fire lane*.

Revise as follows:

506.3.2 Minimum frontage distance. To qualify for an area factor increase based on frontage, the*public way* or open space adjacent to the building perimeter shall have a minimum distance *(W)* of 20 feet (6096 mm) measured at right angles from the building face to any of the following:

1. The closest interior lot line.
2. The entire width of a street, alley or *public way.*
3. The exterior face of an adjacent building on the same property.

The frontage increase shall be based on the smallest*public way* or open space that is 20 feet (6096 mm) or greater, and the percentage of building perimeter having a minimum 20 feet (6096 mm) *public way* or open space. Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.

506.3.3 Amount of increase. The area factor increase based on frontage shall be determined in accordance with Table 506.3.3.

Revise as follows:

TABLE 506.3.3 FRONTAGE INCREASE FACTOR[a]

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)			
	0 to less than 20	20 to less than 25	25 to less than 30	30 or greater
0 to less than 25	~~0~~	0	0	0
25 to less than 50	~~0~~	0.17	0.21	0.25
50 to less than 75	~~0~~	0.33	0.42	0.50
75 to 100	~~0~~	0.50	0.63	0.75

a. Interpolation is permitted.

506.3.3.1 Section 507 buildings. Where a building meets the requirements of Section 507, as applicable, except for compliance with the minimum 60-foot (18 288 mm) *public way* or *yard* requirement, the area factor increase based on frontage shall be determined in accordance with Table 506.3.3.1. The frontage increase shall be based on the smallest public way or open space that is 30 feet (9144 mm) or greater, and the percentage of building perimeter having a minimum 30 feet (9144 mm) public way or open space. Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.

TABLE 506.3.3.1 SECTION 507 BUILDINGS[a]

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)					
	30 to less than 35	35 to less than 40	40 to less than 45	45 to less than 50	50 to less than 55	55 to less than 60 or greater
0 to less than 25	0	0	0	0	0	0
25 to less than 50	0.29	0.33	0.38	0.42	0.46	0.50
50 to less than 75	0.58	0.67	0.75	0.83	0.92	1.00
75 to 100	0.88	1.00	1.13	1.25	1.38	1.50

a. Interpolation is permitted.

Reason: This proposal provides some minor revisions to the new process of determining the frontage increase. We felt that additional clarification was needed for application. The proposed language does not change any technical provisions of the section.
The additional language is needed because there are situations where you can get a larger increase by not using all of the open space around the building.

For a couple examples:

1) A building with four sides open at 30’, 35’, 24’ and 60’. The percentage of building perimeter open (>20’) is 100%, with the smallest open space at 25 feet, my increase would be 0.50.

2) A building with three sides open at 30’ 35’ and 60’, plus a short side that is not open. Assume the percentage of perimeter at least 20’ open at 90%. With the smallest open space that is 20’ or more being 30’, my increase would be 0.75.

So I get a bigger increase with no yard than I do with a 24’ yard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is designed to clarify the requirement.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved as it is not needed as it is understood that one does not have to use the frontage increase. Additionally, when calculating the frontage increase, one does not need to consider all the open spaces around the building. (Vote: 8-7)

Public Comments

Public Comment 1

Proponents: Steve Thomas, Shums Coda Associates, Colorado Chapter ICC (sthomas@coloradocode.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

506.3.2 Minimum frontage distance . To qualify for an area factor increase based on frontage, the*public way* or open space adjacent to the building perimeter shall have a minimum distance *(W)* of 20 feet (6096 mm) measured at right angles from the building face to any of the following:

1. The closest interior lot line.
2. The entire width of a street, alley or *public way.*
3. The exterior face of an adjacent building on the same property.

The frontage increase shall be based on the smallest*public way* or open space that is 20 feet (6096 mm) or greater, and the percentage of building perimeter having a minimum 20 feet (6096 mm) *public way* or open space. ~~Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.~~

506.3.3.1 Section 507 buildings . Where a building meets the requirements of Section 507, as applicable, except for compliance with the minimum 60-foot (18 288 mm) *public way* or *yard* requirement, the area factor increase based on frontage shall be determined in accordance with Table 506.3.3.1. The frontage increase shall be based on the smallest public way or open space that is 30 feet (9144 mm) or greater, and the percentage of building perimeter having a minimum 30 feet (9144 mm) public way or open space. ~~Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.~~

Commenter's Reason: The committee agreed with the major portion of this proposal. However, they did not like the last sentence in Sections 506.3.2 and 506.3.3.1. They felt that the language was more commentary and already permitted by the current language. They did not think it was necessary. Therefore, we have deleted the two sentences to address their concerns. The original reason statement supports the public comment as well. This proposed language is intended to clean up the language based on users of the code contacting us with their questions and concerns. The new language is intended to be a clarification and does not create a technical change.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The proposal is a clarification of the current language.

Final Hearing Results

G116-21	AMPC1

G117-21

Original Proposal

IBC: 507.3

Proponents: Homer Maiel, PE, CBO, ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

2021 International Building Code

Revise as follows:

507.3 Nonsprinklered, one-story buildings. The area of a Group F-2 or S-2 building not more than one*story* above *grade plane* of any *construction type,* ~~in height~~ shall not be limited where the building is surrounded and adjoined by*public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Reason: This change is making the language of Section 507.3 consistent with Section 507.4. No change in technical requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change is merely making the language of Section 507.3 consistent with Section 507.4.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as submitted. The proposal has no technical changes. The proposal modifies the language of Section 507.3 to be consistent with Section 507.4. (Vote: 12-2)

Final Hearing Results

G117-21	AS

G122-21 Part II

Original Proposal

PART II - IBC: 2603.4

Proponents: Dennis Richardson, none, self (dennisrichardsonpe@yahoo.com)

2021 International Building Code

Revise as follows:

2603.4 Thermal barrier. Except as provided for in Sections 2603.4.1 and 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier of $^{1}/_{2}$-inch (12.7 mm) *gypsum wallboard*, *mass timber* or heavy timber in accordance with Section 2304.11 ~~602.4~~ or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275. Combustible concealed spaces shall comply with Section 718.

Reason: See Part 1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
See Part 1.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee thought including mass timber in section 2603.4, Thermal barrier, is a proper action. The proposal updates section 2603.4 to be consistent with the definition of mass timber now found in Section 202 and clarifies the reference to heavy timber in 602.4 is now found in Section 2304.11. (Vote: 13-0)

Final Hearing Results

G122-21 Part II	AS

G123-21

Original Proposal

IBC: 508.4.4.1, 509.4.1.1

Proponents: Paul Coats, American Wood Council, American Wood Council (pcoats@awc.org)

2021 International Building Code

Revise as follows:

508.4.4.1 Construction. Required separations shall be fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies. Mass timber elements serving as fire barriers or horizontal assemblies to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of the building with an approved thermal barrier consisting of gypsum board that is not less than 1/2 inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

Exception: The thermal barrier shall not be required on the top of horizontal assemblies serving as occupancy separations.

509.4.1.1 Type IV-B and IV-C construction. Where Table 509.1 specifies a fire-resistance-rated separation, mass timber elements serving as fire barriers or horizontal assemblies in Type IV-B or IV-C construction shall be separated from the interior of the incidental use with an approved thermal barrier consisting of gypsum board that is not less than 1/2 inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

Exception: The thermal barrier shall not be required on the top of horizontal assemblies serving as incidental use separations.

Reason: The ICC Ad Hoc Committee on Tall Wood Buildings' intent for these provisions was to prohibit exposed mass timber elements in required occupancy and incidental use separations so that under fire conditions the separation would not contribute to the fuel load. However, when a fire-resistance rated horizontal assembly serves as an occupancy separation, the horizontal assembly is typically rated for exposure from the underside. There is no specific protection required on the top of the floor for horizontal assemblies of conventional framing of wood or other materials since there is no thermal barrier requirement for them (unless the assembly contains foam plastic). Mass timber floors (typically cross-laminated timber several inches thick) represents a lesser hazard in these circumstances than a conventional framed floor. Therefore, the protection should be required only on the underside of rated mass timber horizontal assemblies and is unnecessary on the top of floors. The proposed exception does not negate the requirement for one inch of noncombustible material on the top of mass timber floors in Type IV-B.

Cost Impact: The code change proposal will decrease the cost of construction
May decrease the cost of construction. Noncombustible or other protection on the top of floors in required separations will not be required in some circumstances where it currently may be.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as a thermal barrier is not required on the top of a horizontal assembly as along as the stated criteria are satisfied. (Vote: 14-0)

Final Hearing Results

G123-21	AS

G125-21

Original Proposal

IBC: 508.5, 508.5.6

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

508.5 Live/work units. A *live/work unit* shall comply with Sections ~~508.5~~ 508.5.1 through 508.5.11. Live/work units complying with the requirements of Section 508.5.1 through 508.5.11 for the non-residential portion of the unit and that are within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or the *International Residential Code*.

Exception: *Dwelling or sleeping units* that include an office that is less than 10 percent of the area of the *dwelling unit* ~~are~~ shall be permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2.

508.5.1 Limitations. The following shall apply to live/work areas:

1. The *live/work unit* is permitted to be not greater than 3,000 square feet (279 m^2) in area.
2. The nonresidential area is permitted to be not more than 50 percent of the area of each *live/work unit*.
3. The nonresidential area function shall be limited to the first or main floor only of the *live/work unit*.
4. Not more than five nonresidential workers or employees are allowed to occupy the nonresidential area at any one time.

508.5.2 Occupancies. *Live/work units* shall be classified as a Group R-2 occupancy. Separation requirements found in Sections 420 and 508 shall not apply within the *live/work unit* where the *live/work unit* is in compliance with Section 508.5. Nonresidential uses that would otherwise be classified as either a Group H or S occupancy shall not be permitted in a *live/work unit*.

Exception: Storage shall be permitted in the *live/work unit* provided that the aggregate area of storage in the nonresidential portion of the *live/work unit* shall be limited to 10 percent of the space dedicated to nonresidential activities.

508.5.3 Means of egress. Except as modified by this section, the *means of egress* components for a *live/work unit* shall be designed in accordance with Chapter 10 for the function served.

508.5.4 Egress capacity. The egress capacity for each element of the *live/work unit* shall be based on the *occupant load* for the function served in accordance with Table 1004.5.

508.5.5 Spiral stairways. *Spiral stairways* that conform to the requirements of Section 1011.10 shall be permitted.

Revise as follows:

508.5.6 Vertical openings. Floor openings between floor levels of a *live/work unit* ~~are~~ shall be permitted without enclosure.

[F] 508.5.7 Fire protection. The *live/work unit* shall be provided with a monitored *fire alarm* system where required by Section 907.2.9 and an *automatic sprinkler system* in accordance with Section 903.2.8.

508.5.8 Structural. Floors within a *live/work unit* shall be designed for the *live loads* in Table 1607.1, based on the function within the space.

508.5.9 Accessibility. *Accessibility* shall be designed in accordance with Chapter 11 for the function served.

508.5.10 Ventilation. The applicable *ventilation* requirements of the *International Mechanical Code* shall apply to each area within the *live/work unit* for the function within that space.

508.5.11 Plumbing facilities. The nonresidential area of the *live/work unit* shall be provided with minimum plumbing facilities as specified by Chapter 29, based on the function of the nonresidential area. Where the nonresidential area of the *live/work unit* is required to be accessible by Section 1108.6.2.1, the plumbing fixtures specified by Chapter 29 shall be accessible.

Reason: The intent of the proposal is to coordinate the IRC and IBC scoping. IRC Section 101.2 Exception 1 allows for live/work units to be constructed under the IRC. However, the IBC does not state this option in IBC Section 101.2 or this section.

During the discussions, there were concerns that the current requirements for complying with the IRC and the IBC could be a conflict for several of the items listed, such as means of egress, fire protection, structural and accessibility. The addition of 'for the non-residential portion of the unit' should help clarify that the means of egress, fire protection, structural loading and plumbing facilities for the business/mercantile portion of the unit needs to look at the IBC for requirements.

This is one of a group of proposals intended to coordinate the scoping items in IBC Section 101.2 and IRC 101.2. While the proposals work together, then also work separately. The proposal for coordination will be in Group B.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a coordination of scoping requirements and references in the IBC and IRC, not a change to construction requirements.

Staff Note: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved as it still needs work since the wording is unclear. (Vote: 14-0)

Public Comments

Public Comment 2

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

508.5 Live/work units . ~~A l~~*Live/work units* shall comply with one of the following;

1. For a live/work unit located in a building constructed in accordance with this code, both the residential and non-residential portions of the live/work unit shall comply with Sections 508.5 through 508.5.11.

2. For a live/work unit located in a building constructed in accordance with the International Residential Code, the non-residential portion of the live/work unit shall comply with Sections 508.5.1 through 508.5.11, and the residential portion of the live/work unit shall be constructed in accordance with the International Residential Code and Section 508.5.7.

Exception: *Dwelling or sleeping units* that include an office that is less than 10 percent of the area of the*dwelling unit* are permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2.

Commenter's Reason: This public comment represents an effort to coordinate and collaborate proposals G125 and G126, Part 1. I withdrew proposal G126, Part 1 in an effort to consolidate discussion of these items, but the online hearing format and the pressure to speed discussion prevented thorough consideration of this topic, including consideration of a floor modification that included this text. G126, Part 2 was approved, and it is important that the companion effort to clean up the remainder of the live/work provisions be completed.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Intent of this public comment is to clarify existing code requirements.

Final Hearing Results

G125-21	AMPC2

G126-21 Part II

Original Proposal

PART II – IBC[F] 508.5.7

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Building Code

Revise as follows:

[F] 508.5.7 Fire protection. ~~The~~ ~~*live*~~ *Live/work* ~~*unit*~~ *units* constructed in accordance with this code shall ~~comply with~~ ~~be provided with a monitored *fire alarm* system where required by Section 907.2.9 and~~ be provided with all of the following:

1. An *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 ~~903.2.8~~.
2. *Smoke alarms* in accordance with Section 907.2.11.
3. Where required by Section 907.2.9.1, a manual *fire alarm system*.

Live/work units constructed in accordance with the *International Residential Code* shall be provided with an *automatic sprinkler system* and *smoke alarms*. The *automatic sprinkler system* shall comply with *International Residential Code* Section P2904, and *smoke alarms* shall comply with *International Residential Code* Section 314.

Reason: Currently, some live/work units are permitted to be constructed under the IRC, per the IRC scope, but the IRC scope references back to IBC Section 508.5 for additional specific requirements. So presumably, IRC live/work units are constructed to the IRC, except as modified by IBC Section 508.5. On the other hand, IBC live/work units are constructed to the IBC, including Section 508.5. This proposal more clearly states that approach.
In addition, the fire protection requirements have been edited to clarify the allowance to use fire protection requirements in the IRC for IRC live/work units. It does not appear that the intent of membership in establishing live/work provisions was requiring IRC live/work units to comply with IBC Group R2 fire protection requirements. Plus, the IBC fire protection requirements have been clarified/improved by directly referencing the two applicable sprinkler standards for Group R2 vs. sending the user to another code section to receive the references, and the requirement for smoke alarms has been added for completeness.

Regarding fire alarms for live/work units under the IBC, there are not and never have been any special live/work requirements. Instead, the requirements are based on the general Group R2 occupancy triggers and exceptions found in Section 907.2.9.1, which often won't require a fire alarm system for live/work units based on the exceptions. The reference to "monitored" systems has been dropped, as monitoring requirements will be determined by Section 907.

Cost Impact: The code change proposal will decrease the cost of construction
By clearly conveying that IRC live/work units do not have to meet IBC fire protection requirements, the cost of construction for live/work units may be reduced.

Staff Note: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
[F] 508.5.7 Fire protection. *Live/work units* in buildings constructed in accordance with this code shall be provided with all of the following:

1. An *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 .

2. *Smoke alarms* in accordance with Section 907.2.11.
3. Where required by Section 907.2.9.1, a manual *fire alarm system*.

Live/work units in buildings constructed in accordance with the *International Residential Code* shall be provided with an *automatic sprinkler system* and *smoke alarms*. The *automatic sprinkler system* shall comply with *International Residential Code* Section P2904, and *smoke alarms* shall comply with *International Residential Code* Section 314.

Committee Reason: The committee stated that the reason for the approval of the modification was that it clarifies the requirement by specifying that the live work units are in buildings. The reason for the approval of the proposal is that it improves the intent of the requirements and gives the correct code citations for the various items in the list. (Vote: 14-0)

Final Hearing Results

G126-21 Part II	AM

G127-21

Original Proposal

IBC: 508.5.1

Proponents: Hoyt Jeter, City of Tacoma/ Planning and Development, WABO TCD (hjeter@cityoftacoma.org)

2021 International Building Code

Revise as follows:

508.5.1 Limitations. The following shall apply to live/work areas:

1. The *live/work unit* is permitted to be not greater than 3,000 square feet (279 m^2) in area.
2. The nonresidential area is permitted to be not more than 50 percent of the area of each*live/work unit*.
3. The nonresidential area function shall be limited to the first or main floor only of the*live/work unit*.
4. ~~Not more than five nonresidential workers or employees are allowed to occupy the nonresidential area at any one time~~.

Reason: 1. Item number 4 is un-enforceable. When permits are issues, how do you limit the number of employees? The other exceptions will meet the intend allowed per the code.
2. The maximum area of the non-residential area is already limited to 1500 square feet, so the occupant load will be limited by that floor area.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This removes un-enforceable operational language and is not a change to construction requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted. The deleted item #4 was not enforceable. (Vote: 11-2)

Final Hearing Results

G127-21	AS

G128-21

Original Proposal

IBC:TABLE 509.1

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

SECTION 509
INCIDENTAL USES

509.1 General. Incidental uses located within single occupancy or mixed occupancy buildings shall comply with the provisions of this section. Incidental uses are ancillary functions associated with a given occupancy that generally pose a greater level of risk to that occupancy and are limited to those uses specified in Table 509.1.

Exception: Incidental uses within and serving a *dwelling unit* are not required to comply with this section.

Revise as follows:

TABLE 509.1 INCIDENTAL USES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and provide automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In *ambulatory care facilities*, laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour and provide automatic sprinkler system
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour and provide automatic sprinkler system
In Group I-2, physical plant maintenance shops	1 hour and provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 8.67 cubic feet or greater	1 hour and provide automatic sprinkler system
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than100 50 square feet	1 hour and provide automatic sprinkler system
Electrical installations and transformers	See Sections 110.26 through 110.34 and Sections 450.8 through 450.48 of NFPA 70 for protection and separation requirements.

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

Reason: The change to the waste and linen collection items is correlation with the allowances in the federal requirements (K321). The addition of “and provide and automatic sprinkler system” is editorial since Group I is already required to be sprinklered.

This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This a federal certification requirement for Group I-2.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as the proposal coordinates Table 509.1 with the federal requirements. (Vote: 12-2)

Final Hearing Results

G128-21	AS

G130-21

Original Proposal

IBC: 510.2, 707.3.11 (New)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours. Where ~~vertical offsets are provided as part of~~ a *horizontal assembly* <u>contains vertical offsets</u> , the vertical offset ~~and the structure supporting the vertical offset~~ <u>shall be constructed as a fire barrier in accordance with Section 707 and</u> shall have a *fire-resistance rating* of not less than 3 hours.
2. The building below, including the *horizontal assembly* <u>and any associated vertical offsets</u>, is of Type IA construction.
3. *Shaft, stairway, ramp* and escalator enclosures through the *horizontal assembly* shall have not less than a 2-hour *fire-resistance rating* with opening protectives in accordance with Section 716.

   Exception: Where the enclosure walls below the *horizontal assembly* have not less than a 3-hour *fire-resistance rating* with opening protectives in accordance with Section 716, the enclosure walls extending above the *horizontal assembly* shall be permitted to have a 1-hour *fire-resistance rating*, provided that the following conditions are met:
   1. The building above the *horizontal assembly* is not required to be of Type I construction.
   2. The enclosure connects fewer than four stories.
   3. The enclosure opening protectives above the *horizontal assembly* have a *fire protection rating* of not less than 1 hour.
4. *Interior exit stairways* located within the Type IA building are permitted to be of combustible materials where the following requirements are met:

   4.1. The building above the Type IA building is of Type III, IV, or V construction.

   4.2. The *stairway* located in the Type IA building is enclosed by 3-hour fire-resistance-rated construction with opening protectives in accordance with Section 716.
5. The building or buildings above the *horizontal assembly* shall be permitted to have multiple Group A occupancy uses, each with an *occupant load* of less 300, or Group B, M, R or S occupancies.
6. The building below the *horizontal assembly* shall be protected throughout by an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and shall be permitted to be any occupancy allowed by this code except Group H.

7, The maximum *building height* in feet (mm) shall not exceed the limits set forth in Section 504.3 for the building having the smaller allowable height as measured from the *grade plane*.

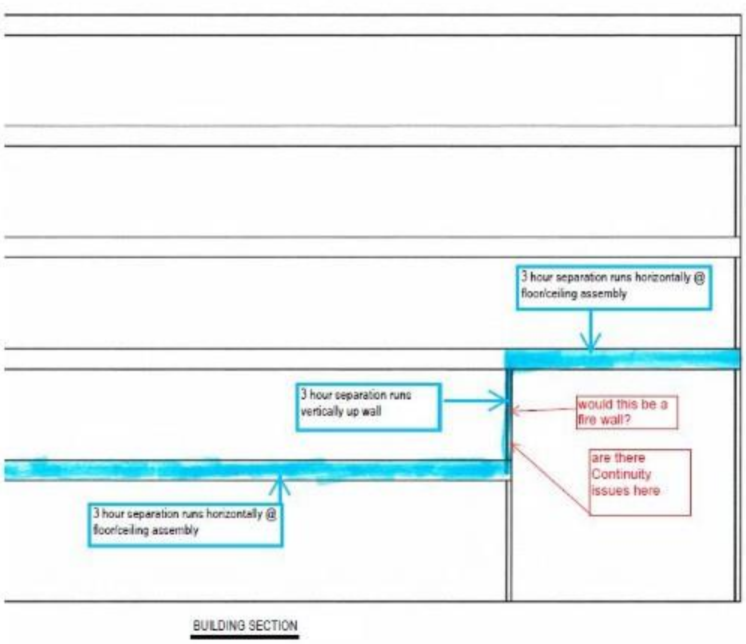
Add new text as follows:

<u>**707.3.11 Horizontal separation offsets.** The fire-resistance rating of a fire barrier serving as the vertical offset in a horizontal building separation shall comply with Section 510.2.</u>

Reason: The code provides for the allowance of vertical offsets in horizontal building separations, but does not clarify how the separation must be constructed other than to also be 3-hour rated. This code proposal fills in the gap so that users know what type of assembly must be used, fire barriers, and subsequently how to address openings, penetrations, joints, continuity, etc. This also clarifies that the vertical offset must also be Type 1A construction just like the horizontal assembly does.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban



interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only provides clear direction as to how the vertical offset must be constructed, in the manner that it likely commonly is.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as the proposal clarifies the intent and provides continuity. (Vote: 14-0)

Final Hearing Results

G130-21	AS

G132-21

Original Proposal

IBC: 510.2

Proponents:

Sarah Rice, The Preview Group. Inc., representing The Preview Group (srice@preview-group.com)

2021 International Building Code

Revise as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours. Where vertical offsets are provided as part of a *horizontal assembly*, the vertical offset and the structure supporting the vertical offset shall have a *fire-resistance rating* of not less than 3 hours.
2. The building below, including the *horizontal assembly*, is of Type IA construction.
3. *Shaft, stairway, ramp* and escalator enclosures through the *horizontal assembly* shall have not less than a 2-hour *fire-resistance rating* with opening protectives in accordance with Section 716.

   Exception: Where the enclosure walls below the *horizontal assembly* have not less than a 3-hour *fire-resistance rating* with opening protectives in accordance with Section 716, the enclosure walls extending above the *horizontal assembly* shall be permitted to have a 1-hour *fire-resistance rating*, provided that the following conditions are met:
   1. The building above the *horizontal assembly* is not required to be of Type I construction.
   2. The enclosure connects fewer than four stories.
   3. The enclosure opening protectives above the *horizontal assembly* have a *fire protection rating* of not less than 1 hour.
4. *Interior exit stairways* located within the Type IA building are permitted to be of combustible materials where the following requirements are met:

   4.1. The building above the Type IA building is of Type III, IV, or V construction.

   4.2. The *stairway* located in the Type IA building is enclosed by 3-hour fire-resistance-rated construction with opening protectives in accordance with Section 716.
5. The building or buildings above the *horizontal assembly* shall be permitted to have ~~multiple~~ Group A ~~occupancy uses, each with an *occupant load* of less 300, or Group~~ B, M, R or S occupancies.
6. The building below the *horizontal assembly* shall be protected throughout by an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and shall be permitted to be any occupancy allowed by this code except Group H.

7, The maximum *building height* in feet (mm) shall not exceed the limits set forth in Section 504.3 for the building having the smaller allowable height as measured from the *grade plane*.

Reason: The IBC currently limits a building that is over what is commonly referred to as a "podium building" (IBC Section 510.2, Item 5) to having "multiple Group A occupancy uses, each with an occupant load of
less than 300." This means that no single assembly space is allowed to have an occupant load of 300 persons within a building located above the horizontal assembly - think museum, swimming pool deck or movie theater. or a health club. Again, I want you remember that this is a limit to ALL Group A occupancies, not just large entertainment venues - think outdoor sculpture museums (Group A-3). And in this day of COVID-19, think outdoor restaurants (Group A-2) or even outdoor places of religious worship (Group A-5). The current language in the code would not allow these to occur over a podium building. This limitation really curtails the construction of buildings that are placed

on a podium building on an inner city site.

And what just does "shall be permitted to have multiple Group A occupancy uses, each with an occupant load of 300" mean? Does each Group A space with 299 occupants have to be separated from an adjacent Group A space with 299 occupants? And if so, does the separation need to be fire rated? But what if each of these spaces with 299 persons discharge out into a foyer (that has an occupant load of 299) and which leads to the exterior? Is that acceptable? But then everyone is discharged out onto the horizontal assembly to open air - just like a Group A-5 occupancy - but oops, a Group A-5 occupancy cannot have more than 300 persons to be located above the horizontal assembly.

This proposal seeks to eliminate the Group A 299 occupant load limitation in its entirety and let the overall provisions found in the IBC dictate the design of the Group A building or building with a Group A occupancy constructed over the horizontal assembly.

While this limitation, and all what is currently in IBC 510 has been in the IBC since the 2000 IBC, the real roots of the entire section are in one of the legacy codes - the Uniform Building Code (UBC) Section 311.2.2.1

"311.2.2.1 Group S, Division 3 with Group A, Division 3; Group B; Group M or R, Division 1 Occupancy above.

Other provisions of this code notwithstanding, a basement or first story of a building may be considered as a separate and distinct building for the purpose of area limitations, limitation of number of stories and type of construction, when all of the following conditions are met:"

And specifically Item 2 in UBC Section 311.2.2.1:

"2. The building above the three-hour occupancy separation contains only Group A, Division 3; Group B; or Group M or R, Division 1 Occupancies."

In the 1997 UBC Group A was divided into 5 sub classifications:

- Division 1 - Any assembly building or portion of a building with a legitimate stage and an occupant load of 1,000 or more
- Division 2 - Any assembly building or portion of a building with an occupant load of less than 1,000 and a legitimate stage.
- Division 2.1 - Any assembly building or portion of a building with an occupant load of 300 or more without a legitimate stage, including such buildings used for educational purposes and not classified as a Group E or Group B, Division 2 Occupancy.
- Division 3 - Any assembly building or portion of a building with an occupant load of less than 300 without a legitimate stage, including such buildings used for educational purposes and not classified as a Group E or Group B, Division 2 Occupancies
- Division 4 - Stadiums, reviewing stands and amusement park structures not included within other Group A occupancies.

The thing is, the UBC occupancy classifications do correlate in any way to the Group A occupancy classifications in 2021 IBC nor in how the provisions are applied. When the applicable provisions of the IBC are applied to a building with an assembly space having an occupant load of 300 or more, it is unjustified and inconsistent to prohibit that space from being located on top of podium building.

Cost Impact: The code change proposal will decrease the cost of construction

If accepted this code change will reduce the cost of construction as buildings above a podium building will have a broader choice of types of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

510.2 Horizontal building separation allowance.

A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours. Where vertical offsets are provided as part of a *horizontal assembly*, the vertical offset and the structure supporting the vertical offset shall have a *fire-resistance rating* of not less than 3 hours.
2. The building below, including the *horizontal assembly*, is of Type IA construction.
3. *Shaft, stairway, ramp* and escalator enclosures through the *horizontal assembly* shall have not less than a 2-hour *fire-resistance rating* with opening protectives in accordance with Section 716.

   Exception: Where the enclosure walls below the *horizontal assembly* have not less than a 3-hour *fire-resistance rating* with opening protectives in accordance with Section 716, the enclosure walls extending above the *horizontal assembly* shall be permitted to have a 1-hour *fire-resistance rating*, provided that the following conditions are met:

   1. The building above the *horizontal assembly* is not required to be of Type I construction.
   2. The enclosure connects fewer than four stories.
   3. The enclosure opening protectives above the *horizontal assembly* have a *fire protection rating* of not less than 1 hour.

4. *Interior exit stairways* located within the Type IA building are permitted to be of combustible materials where the following requirements are met:

   4.1. The building above the Type IA building is of Type III, IV, or V construction.

   4.2. The *stairway* located in the Type IA building is enclosed by 3-hour fire-resistance-rated construction with opening protectives in accordance with Section 716.

5. The building or buildings above the *horizontal assembly* shall be permitted to have Group A, B, M, R ~~or~~ and S occupancies.
6. The building below the *horizontal assembly* shall be protected throughout by an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and shall be permitted to be any occupancy allowed by this code except Group H.

7, The maximum *building height* in feet (mm) shall not exceed the limits set forth in Section 504.3 for the building having the smaller allowable height as measured from the *grade plane*.

Committee Reason: The proposal was approved as modified by Eckhoff-1. The proposal with the modification removes the restrictions on Group A occupancies. The modification clarifies the intent. (Vote: 14-0)

Final Hearing Results

G132-21	AM

G136-21

Original Proposal

IBC: TABLE 601

Proponents: Bill McHugh, The McHugh Company, National Fireproofing Contractors Association (bill@mc-hugh.us)

2021 International Building Code

Revise as follows:

TABLE 601 FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitionsExterior	See Table 705.5											
Nonbearing walls and partitionsInterior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1 1/2[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	1 1/2	1	1	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor or mezzanine immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber complying with Section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less *fire-resistance rating is required.*

d. Not less than the fire-resistance rating required by other sections of this code.

e. Not less than the fire-resistance rating based on fire separation distance (see Table 705.5).

f. Not less than the fire-resistance rating as referenced in Section 704.10.

g. Heavy timber bearing walls supporting more than two floors or more than a floor and a roof shall have a*fire resistance* rating of not less than 1 hour.

Reason: This section of the code seems to cause a lot of confusion in the field, according to reports to the National Fireproofing Contractors Association. The purpose of this proposal is to bring a key point from the IBC Commentary into the code. It seems the commentary has a graphic that depicts a mezzanine to show visually what this section means -- that the mezzanine located less than 20' below the roof - triggers fire protection of structural members.

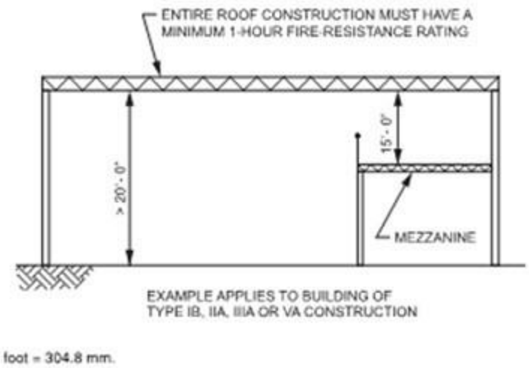


Figure 601(2)
PROTECTION OF ROOF CONSTRUCTION

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this is a proposal to clarify what is already in the code to eliminate confusion, there is no cost increase or decrease.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as the proposal provides good clarification of the code's intent. (Vote: 14-0)

Final Hearing Results

G136-21	AS

G144-21

Original Proposal

IBC: 602.4

Proponents: James Smith, American Wood Council, American Wood Council (jsmith@awc.org)

2021 International Building Code

Revise as follows:

602.4 Type IV. Type IV construction is that type of construction in which the *building elements* are *mass timber* or noncombustible materials and have *fire-resistance ratings* in accordance with Table 601. *Mass timber* elements shall meet the *fire-resistance-rating* requirements of this section based on either the *fire-resistance rating* of the *noncombustible protection*, the *mass timber*, or a combination of both and shall be determined in accordance with Section 703.2. The minimum dimensions and permitted materials for *building elements* shall comply with the provisions of this section and Section 2304.11. *Mass timber* elements of Types IV-A, IV-B and IV-C construction shall be protected with *noncombustible protection* applied directly to the *mass timber* in accordance with Sections 602.4.1 through 602.4.3. The time assigned to the *noncombustible protection* shall be determined in accordance with Section 703.6 and comply with Section 722.7. *Cross-laminated timber* shall be labeled as conforming to ANSI/APA PRG 320 as referenced in Section 2303.1.4.

Exterior *load-bearing walls* and *nonload-bearing walls* shall be *mass timber* construction, or shall be of noncombustible construction.

Exception: Exterior *load-bearing walls* and *nonload-bearing walls* of Type IV-HT Construction in accordance with Section 602.4.4.

The interior *building elements*, including *nonload-bearing walls* and partitions, shall be of *mass timber* construction or of noncombustible construction.

Exception: Interior *building elements* and *nonload-bearing walls* and partitions of Type IV-HT construction in accordance with Section 602.4.4.

Combustible concealed spaces are not permitted except as otherwise indicated in Sections 602.4.1 through 602.4.4. Combustible stud spaces within light frame walls of Type IV-HT construction shall not be considered concealed spaces, but shall comply with Section 718.
In buildings of Type IV-A, IV-B, and IV-C construction with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department <u>vehicle</u> access, up to and including 12 *stories* or 180 feet (54 864 mm) above *grade plane*, *mass timber* interior exit and elevator hoistway enclosures shall be protected in accordance with Section 602.4.1.2. In buildings greater than 12 *stories* or 180 feet (54 864 mm) above *grade plane*, interior exit and elevator hoistway enclosures shall be constructed of noncombustible materials.

Reason: This change is editorial and does not change the requirements of the section. The ICC Building Code Action Committee asked AWC to consider taking on this code change proposal when it found one of the proposals by the ICC Tall Wood Building Ad Hoc Committee (TWB) included language that was different from that used elsewhere in the code. We reached out to members of the TWB Committee to see if there was a reason why they used “lowest level of fire department access” instead of “lowest level of fire department vehicle access” and it was confirmed that there was no reasoning or intent behind their use of a differing phrase. Accordingly, we are proposing the change to make it consistent with the language found in other areas of the code, including the definition of "HIGH-RISE BUILDING" as follows: **[BG] HIGH-RISE BUILDING**. A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is just an editorial clean up to make the language consistent to that found elsewhere in the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as it is editorial and clarifies the intent consistent with the code provisions elsewhere in the IBC. (Vote: 14-0)

Final Hearing Results

G144-21	AS

G147-21

Original Proposal

IBC: 602.4.2.2.2, 602.4.2.2.4

Proponents: Susan Jones, atelierjones, llc, atelierjones, llc (susan@atelierjones.com); Stephen DiGiovanni, Clark County, Self (sdigiovanni@clarkcountynv.gov); Carl Baldassarra, Wiss Janney Elstner Associates, Inc, Self (cbaldassarra@wje.com)

2021 International Building Code

602.4.2.2 Interior protection. Interior faces of all *mass timber* elements, including the inside face of exterior *mass timber* walls and *mass timber* roofs, shall be protected, as required by this section, with materials complying with Section 703.3.

602.4.2.2.1 Protection time. *Noncombustible protection* shall contribute a time equal to or greater than times assigned in Table 722.7.1(1), but not less than 80 minutes. The use of materials and their respective protection contributions specified in Table 722.7.1(2) shall be permitted to be used for compliance with Section 722.7.1.

Revise as follows:

602.4.2.2.2 Protected area. Interior faces of *mass timber* elements, including the inside face of exterior*mass timber walls* and *mass timber roofs*, shall be protected in accordance with Section 602.4.2.2.1.

Exceptions: Unprotected portions of *mass timber*ceilings and walls complying with Section 602.4.2.2.4 and the following:

1. Unprotected portions of mass timber ceilings and walls complying with one of the following:
   1.1. Unprotected portions of *mass timber* ceilings, including attached beams, shall be permitted and shall be limited to an area <u>less than or</u> equal to ~~20~~ <u>100</u> percent of the floor area in any *dwelling unit* or *fire area.*

   1.2. Unprotected portions of *mass timber* walls, including attached columns, shall be permitted and shall be limited to an area <u>less than or</u> equal to 40 percent of the floor area in any *dwelling unit* or *fire area.*

   1.3. Unprotected portions of both walls and ceilings of *mass timber*, including attached columns and beams, in any *dwelling unit* or *fire area* shall be permitted in accordance with Section 602.4.2.2.3.

2. *Mass timber* columns and beams that are not an integral portion of walls or ceilings, respectively, shall be permitted to be unprotected without restriction of either aggregate area or separation from one another.

602.4.2.2.3 Mixed unprotected areas. In each *dwelling unit* or *fire area* , where both portions of ceilings and portions of walls are unprotected, the total allowable unprotected area shall be determined in accordance with Equation 6-1.

$$(U_{tc}/U_{ac}) + (U_{tw}/U_{aw}) \leq 1$$ **Equation 6-1**

where:

U_{tc} = Total unprotected *mass timber* ceiling areas.

U_{ac} = Allowable unprotected *mass timber* ceiling area conforming to Exception 1.1 of Section 602.4.2.2.2.

U_{tw} = Total unprotected *mass timber* wall areas.

U_{aw} = Allowable unprotected *mass timber* wall area conforming to Exception 1.2 of Section 602.4.2.2.2.

Revise as follows:

602.4.2.2.4 Separation distance between unprotected mass timber elements. In each *dwelling unit* or *fire area*, unprotected portions of *mass timber* walls ~~and ceilings~~ shall be not less than 15 feet (4572 mm) from unprotected portions of other walls~~and ceilings, measured horizontally along the ceiling and from other unprotected portions of walls~~ measured horizontally along the floor.

Reason: The Ad-Hoc Committee on Tall Wood Buildings (TWB) was created by the Board of Directors of the International Code Council (ICC) to explore the science of tall wood buildings and take action on developing code changes for tall wood buildings. The TWB created several code change proposals with respect to the concept of tall buildings of mass timber in the last code cycle. All of the TWB proposals were approved.
The TWB decided, as it worked its way through data and research, that it would only incorporate criteria into the code that had bases in tests. When the fire test program at ATF was being developed, a determination was made regarding how much ceiling area and how much wall area and in which combinations could be left exposed in those tests. Limitations in the physical equipment (exhaust hood and exhaust duct connector) limited the amount of exposed MT material and led to a conservative calculation estimate which, for ceilings, became 20% of the floor area. Thus, the number that was incorporated into the text of the 2021 IBC reflected those limitations.

The proposed revisions above are based upon recently completed research conducted at the Research Institute of Sweden (RISE). These fire tests demonstrated that the proposed amounts of unprotected areas on the ceiling and walls, as a function of floor area, can be safely implemented while still achieving the performance objectives specified by the ICC Tall Wood Building Ad-Hoc Committee in the development of the tall building mass timber provisions in the 2021 I-codes. Specifically, Test 1 of the test series conducted at RISE involved a ceiling in which 100% of the area was unprotected mass timber. Tests 2 and 5 had unprotected mass timber on 100% of the ceiling area, in addition to unprotected areas on the two opposing side walls, equivalent to 78% of the floor area. These tests exhibited satisfactory performance in that no significant fire re-growth was observed and temperatures within the compartment decreased continuously from the time of the fully-developed phase until the end of the four-hour test.

The proposed increase of allowable unprotected area on the ceiling from 20% to 100% is consistent with the configurations tested in all of the RISE tests. Although the RISE data also justifies a higher percentage of unprotected area of the wall, this proposal leaves the limit at 40% of the floor area for the sake of conservatism. Videos of the tests performed at RISE may be viewed at the following link: https://www.ri.se/en/what-we-do/expertises/fire-safety-timber-buildings

Furthermore, all of the code proposals included in the work of the TWB were based on CLT products using an earlier edition of material standard PRG 320. During that code development process, being responsive to the concerns of the TWB, the industry demonstrated that the latest PRG-320 standard required a higher grade of adhesive to limit delamination during fire exposure. These RISE fire tests used the subsequent improvements in the code-referenced product standard for CLT (ANSI/APA PRG-320), resulting in enhancements to fire safety.

Cost Impact: The code change proposal will decrease the cost of construction
The prosed changes will decrease the cost of construction, by reducing the required amount of noncombustible protection on walls and ceilings in Type IV-B Construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The proposal was approved as submitted since the provided preliminary RISE test report indicated that the test met or exceeded the requirements. (Vote: 9-5)

Public Comments

Public Comment 2

Proponents: Jason Smart, American Wood Council, AWC (jsmart@awc.org); David Tyree, American Wood Council, AWC (dtyree@awc.org) requests As Submitted

Commenter's Reason: We request approval as submitted, as recommended by the code development committee. The committee was correct that tests performed at the Research Institutes of Sweden (RISE) met or exceeded the fire safety performance objectives specified by the ICC Tall Wood Building Ad Hoc Committee. Most of the committee members studied the RISE test report and agreed that it justified approval of the proposal.

To address the comment that reporting was not yet complete and the membership should wait until it is completed, please note the results and conclusions have been made available since before the CAH, and the final report is now available at the following link:

https://www.ri.se/en/what-we-do/expertises/fire-safety-of-timber-buildings

In response to a committee member that had reservations due to the limited history of buildings that have been constructed to date and concerns over how to repair fire damage the following is offered: 1) there are plenty of examples of exposed heavy timber construction in North America – certainly more than enough to provide ‘proof of concept,’ 2) part of the research conducted at RISE deals with the topic of how to repair a mass timber structure that has experienced a fire. The results of this study are also published in the final RISE report, available at the link above.

To help increase the comfort level in acceptance of the committee action and to address any remaining concerns, AWC has presented a webinar with Daniel Brandon, RISE, to discuss the test results, findings and conclusions of the research performed at RISE. This webinar may be viewed at the following link:

https://www.awc.org/education/main/lists/des-design-considerations/des612---expanding-mass-timber-opportunities-through-testing-and-code-development

We also felt the votes by the few committee members who voted against the motion to approve G147 may have been swayed by the opposition testimony provided at the Committee Action Hearings, so we are offering rebuttal to each of their concerns and comments as follows.

Opposition comment: It is too soon for this change. The Type IV-A, B and C mass timber provisions were just added to the 2021 IBC in the last cycle, and now we’re starting to pick these provisions apart with changes like G147, after all the work that the TWB Committee did with their evaluations. **Rebuttal:** Rather than ‘picking apart’ the provisions developed by the TWB Committee, this proposal is intended to complement it by addressing a factor that could not be addressed at the time of the ATF tests due to the fact that PRG 320-18-compliant CLT was not available at that time. Because PRG 320-18-compliant CLT was not available at the time of the tests performed at ATF, the exposed mass timber areas tested in that series had to be kept to a lower percentage than would have been otherwise justified had PRG 320-18-compliant CLT been used. So, in the absence of test data showing that the full ceiling area could be safely exposed where PRG 320-18-compliant CLT is used, the TWB Committee set the original ceiling area limits equivalent to what was tested in ATF Test 2. Now that we have the data that the TWB did not have at their disposal, based on testing performed on PRG 320-18-compliant CLT, which the 2021 IBC requires anyway, this proposal is perfectly logical, timely, prudent and justifiable.

Opposition comment: The TWB worked for over a year-and-a-half to develop their proposals, but this proposal is based on just one set of tests from Sweden. **Rebuttal:** The justification for the proposal in G147 is the result of two years’ worth of research by a team of world-renowned experts in fire science at the Research Institute of Sweden (RISE). It would be a misrepresentation to imply that this research was simply cobbled together in a haphazard manner.

Opposition comment: The RISE tests used a different fuel load basis than the ATF tests. **Rebuttal:** This is incorrect. Both the ATF tests and the RISE tests used approximately the same fuel load. The ATF tests used a fuel load of 550 MJ/m^2. The RISE tests used a fuel load of 560 MJ/m^2.

Opposition comment: The RISE tests were less severe than the E119 test that the other building materials must test to for fire resistance. **Rebuttal:** The tests performed at RISE were not “less severe”, they were*different* than a standard ASTM E119 exposure because they followed natural growth and decay curves. Moreover, in certain respects (such as during the fully developed phase), they actually resulted in a more severe exposure for temperature and heat flux exposure than would result from a standard ASTM E119 curve.

Opposition comment: Standardized test protocols should have been used, instead of the non-standard tests performed at RISE. **Rebuttal:** A multitude of tests have been performed on CLT, including standardized tests (such as horizontal and vertical ASTM E119 fire-resistance tests). The results from many of these tests are readily available on AWC’s website. As for why non-standard tests such as those performed at ATF and RISE were performed *in addition* to the standardized tests, the TWB Committee developed a set of six fire performance objectives at the outset of their work. They recognized early-on that it would not be possible to assess these fire performance objectives by simply performing standardized tests alone. This is why they developed the ATF test series: to determine whether the new mass timber construction types could meet their fire performance objectives. The TWB Fire Work Group determined that this assessment needed to be performed on a full scale structure which resulted in the two story structure of the test series. The configurations tested in the research at RISE were similar to the ATF tests in many respects (including fuel load density), with the primary differences being that 1) PRG 320-18-compliant CLT was used, and 2) commensurately larger areas of mass timber were exposed.

Opposition comment: It would be unsafe to allow an exposed mass timber area on a wall to intersect an exposed mass timber area on the ceiling. **Rebuttal:** All five of the RISE tests involved configurations in which exposed mass timber areas on the walls intersected exposed mass timber areas on the ceiling. These were not shown to be problem areas, and did not result in fire re-growth.

Opposition comment: This proposal would allow for 100% of the mass timber to be exposed on the ceiling, with the top 40% of the intersecting wall also exposed simultaneously. **Rebuttal:** This is incorrect. The options under Exception 1 to IBC Section 602.4.2.2.2 are mutually exclusive –only one of them can be applied for any particular fire area or dwelling unit. Because of this, it would not be permissible to have 100% of the ceiling exposed and simultaneously have exposed mass timber on the walls.

Opposition comment: The concern of delamination has not been completely resolved. **Rebuttal:** The Tall Wood Building (TWB) Committee's original concern over delamination has to do with fire re-growth, which could lead to a second flashover. While delamination led to this unacceptable fire performance in some of the tests performed using the previous generation of CLT, this concern is now addressed through qualification requirements in the CLT product standard (PRG 320-18). Now the CLT adhesive is required to be qualified under PRG 320-18, proving that it does not exhibit delamination which can cause fire re-growth leading to a second flashover. Compartment fire tests performed with this newer generation of CLT have also verified this superior fire performance. Not only has this concern been resolved, but the outcome of this resolution (i.e., the newer generation of CLT products) is what made it possible to meet the fire safety performance objectives in the more rigorous test configurations of the RISE test series.

Opposition comment: The RISE tests were conducted in open air, so how was the performance of the interior protection evaluated?" **Rebuttal:** Although the test structures were situated outside, in open air, the interior protection wasinside the test structure in each test. Every building is ultimately located "outside" so this is a legitimate *full scale* test of a building, not just a system. This scenario is representative of a building fire in which the glazing has broken out in the openings. Except in the case of tempered glass, the glazing would typically break and fall out (either partially or completely) during a fully developed fire. By testing a configuration without any glazing in the openings, more oxygen is supplied to the fire during the growth phase, thereby allowing the fire to reach the fully developed phase sooner. This also eliminates a significant source of test variability related to the timing and degree to which the glazing would break out of the openings.

Bibliography: The final RISE report is now available at the following link:
https://www.ri.se/en/what-we-do/expertises/fire-safety-of-timber-buildings

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The prosed changes will decrease the cost of construction, by reducing the required amount of noncombustible protection on walls and ceilings in Type IV-B Construction.

Final Hearing Results

G147-21	AS

G148-21

Original Proposal

IBC: 602.4.2.2.2

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

Revise as follows:

602.4.2.2.2 Protected area. Interior faces of *mass timber* elements, including the inside face of exterior*mass timber walls* and *mass timber roofs*, shall be protected in accordance with Section 602.4.2.2.1.

Exceptions: Unprotected portions of *mass timber* ceilings and walls complying with Section 602.4.2.2.4 and the following:

1. Unprotected portions of mass timber ceilings and walls complying with one of the following:
   1.1. Unprotected portions of *mass timber* ceilings, including attached beams, shall be permitted and shall be limited to an area equal to 20 percent of the floor area in any *dwelling unit* <u>within a story</u> or *fire area*<u>within a story</u>.

   1.2. Unprotected portions of *mass timber* walls, including attached columns, shall be permitted and shall be limited to an area equal to 40 percent of the floor area in any *dwelling unit* <u>within a story</u> or fire area <u>within a story</u>.

   1.3. Unprotected portions of both walls and ceilings of*mass timber*, including attached columns and beams, in any*dwelling unit* or *fire area* shall be permitted in accordance with Section 602.4.2.2.3.

2. *Mass timber* columns and beams that are not an integral portion of walls or ceilings, respectively, shall be permitted to be unprotected without restriction of either aggregate area or separation from one another.

Reason: The proposed code change is based on a public comment that was withdrawn from consideration for code change G108-18 at the Group A PCH, which was the main code change. The public comment was withdrawn and not considered at the request of supporters of Tall wood who at the time argued that a legitimate public comment added with the hundreds of of opposition public comments would put the tall wood proposal in jeopardy due to the online governmental voting process.
Fire area is defined by the designer of the building and is used to limit the scope of application of fire sprinklers and/or fire alarm. As published in the the 2021 IBC, the Section proposed to be revised will allow multiple stories in Type IV B construction with exposed ceilings and walls in a multi-level units and in non-residential buildings like an office building.

- This condition was not tested during the code development process for Tall Wood package; it was also not discussed during the lengthy heated debate on the complex tall wood package.
- A single story dwelling unit or multi-story dwelling unit within a tall wood building constructed of Type IV B construction will be separated from adjacent dwelling units with fire resistive construction, as low as 1/2 hour and a non-residential tenant spaces may not be separated from adjoining tenant spaces.

Additionally, Section 602.4.2.2.4 requires that exposed portions of walls and ceilings be separated form one another by 15 feet, however the Section seems to apply within the story. The intent of the protection discussed in Section 602.4.2.2.2 is to limit the amount of exposed wood in walls and ceilings even if their thickness provides for the required fire resistance rating. A concern has been that the exposed wood can contribute to the fire load and full scale testing performed to technically substantiate the requirements in Section 602.4.2.2.2 did not envision open multiple stories and the full scale test set up included protected shafts between stories.

After speaking with some of original proponents for the exceptions to Section 602.4.2.2.2, it was clear that the Tall Wood committee struggled to find a simple useable method to address a desire by the architectural community to allow for the warmth and beauty of wood to be exposed and appreciated by occupants.

Fire area is defined as "[BF] FIRE AREA. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above."

- Fire area is bounded by horizontal assemblies and fire barriers, however not all horizontal assemblies are required to be continuous to exterior walls.
- Not all vertical openings between stories that pass through horizontal assemblies need to be protected. Section 712 of the IBC permits openings between stories that are not protected with fire barriers and Section 712.1.12 permits many interconnected stories. Section 712 includes numerous subsections that permit the omission of shaft protection for vertical openings.
- Yes fire area was an elegant solution but perhaps the limitation should have been within dwelling units and separated tenant spaces.

We request that the General Committee approve this reasonable update to the exception to limit applicability of the exception within a story for both dwelling units and fire areas.

2018 IBC Commentary Fire Area

[BF] FIRE AREA. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above.

This term is used to describe a specific and controlled area within a building that may**consist of a portion of the floor area within a single story, one entire story or the combined floor area of several stories, depending on how these areas are enclosed and separated from other floor areas**. Where a fire barrier with a fire-resistance rating in accordance with Section 707.3.10 divides the floor area of a one-story building, the floor area on each side of the wall would constitute a separate fire area. Where a horizontal assembly separating the two stories in a two-story building is fire-resistance rated in accordance with Section 711.2.4, each story would be a separate fire area. In cases where mezzanines are present, the floor area of the mezzanine is included in the fire area calculations, even though the area of the mezzanine does not contribute to the building area calculations. See the commentary to Sections 707.3.10 and 711.2.4 for further information.

Note that fire walls are one way of creating fire areas but are typically used to create separate buildings.

Cost Impact: The code change proposal will increase the cost of construction
The proposed code change may increase the cost of construction in that more gypsum board we be required. However this building system is so new there is not much history of applications for precision in this determination.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted consistent with the provided reason statement. (Vote: 12-2)

Final Hearing Results

G148-21	AS

G149-21

Original Proposal

IBC: 602.4.2.3

Proponents: Jonathan Siu, Self, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

602.4.2.3 Floors. The floor assembly shall contain a noncombustible material not less than 1 inch (25 mm) in thickness above the*mass timber*. Floor finishes in accordance with Section 804 shall be permitted on top of the noncombustible material.<u>Except where unprotected mass timber ceilings are permitted in Section 602.4.2.2.2,</u> ~~The~~ <u>the</u> underside of floor assemblies shall be protected in accordance with Section 602.4.1.2.

Reason: This code change proposal is intended to address an apparent conflict in the code.

For Type IV-B construction, the current code requires the underside of mass timber floor assemblies to be protected in accordance with the provisions for Type IV-A construction (the last sentence in Section 602.4.2.3 points to Section 602.4.1.2). However, Section 602.4.1.2 does not permit any exposed mass timber ("…interior faces of **all** mass timber elements…shall be protected…." [emphasis mine]). This conflicts with Section 602.4.2.2.2, which allows some limited exposed mass timber.

This proposal eliminates the conflict by clarifying the reference to Type IV-A construction does not apply to the unprotected portions of mass timber permitted for Type IV-B construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this is a resolution of an apparent conflict in the code, there is no increase or decrease in the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The proposal was approved as submitted. The proposal cleans up the existing language and eliminates a possible conflict. (Vote: 13-0)

Final Hearing Results

G149-21	AS

G150-21

Original Proposal

IBC: 602.4.4.3

Proponents: James Smith, American Wood Council, American Wood Council (jsmith@awc.org)

2021 International Building Code

Revise as follows:

602.4.4.3 Concealed spaces. Concealed spaces shall not contain combustible materials other than *building elements* and electrical, mechanical, fire protection, or plumbing materials and equipment permitted in plenums in accordance with Section 602 of the *International Mechanical Code*. Concealed spaces shall comply with applicable provisions of Section 718. Concealed spaces shall be protected in accordance with one or more of the following:

1. The building shall be sprinklered throughout in accordance with Section 903.3.1.1 and automatic sprinklers shall also be provided in the concealed space.
2. The concealed space shall be completely filled with noncombustible insulation.
3. Combustible surfaces ~~Surfaces~~ within the concealed space shall be fully sheathed with not less than $^{5}/_{8}$-inch Type X *gypsum board.*

Exception: Concealed spaces within interior walls and partitions with a 1-hour or greater *fire-resistance rating* complying with Section 2304.11.2.2 shall not require additional protection.

Reason: The change is necessary to adequately convey the intent of the third protection alternative. Only combustible surfaces in concealed spaces need to be protected. If a concealed space is created by furring out with steel studs, for instance, only the heavy timber surfaces would need to be sheathed with 5/8 inch Type X gypsum board, not the steel studs.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
We feel this change is essentially editorial in nature in that it is only clarifying the text to match the original intent of the 3rd option.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as the committee agreed with the reason statement that non-combustible surface need not be covered. (Vote: 14-0)

Final Hearing Results

G150-21	AS

G151-21

Original Proposal

IBC: 602.4.4.4

Proponents: James Smith, American Wood Council, American Wood Council (jsmith@awc.org)

2021 International Building Code

Revise as follows:

602.4.4.4 Exterior structural members. Where a ~~horizontal~~ *fire separation distance* of 20 feet (6096 mm) or more is provided, wood columns and arches conforming to heavy timber sizes complying with Section 2304.11 shall be permitted to be used externally.

Reason: Although it has been correctly explained in the IBC Commentary for many editions, code officials sometimes question the intent of this section, and wonder if the exterior columns themselves must be separated from one another. Using the defined term “fire separation distance” will eliminate any confusion as to how that distance is to be measured. This change is editorial and does not change the requirement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
We feel that this proposed change only reflects theintent of the code.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The proposal was approved as submitted as it clarifies the intent of the code. (Vote: 14-0)

Final Hearing Results

G151-21	AS

G153-21

Original Proposal

IBC: 603.1

Proponents: Christopher Athari, Hoover Treated Wood Products, Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* complying with Section 2303.2 shall be permitted in:
   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*

   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

   1.3. Roof construction, including girders, trusses, framing and decking.

   Exceptions:

   1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
   2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A *roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

   1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.

11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood complying with Section 2303.2, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

Reason: To establish consistency within the code. Throughout the section, language appears as both, “complying with 2303.2” and without it. I am adding the, “complying with 2303.2” to the sections where it has been left off.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is a clerical addition to the code. The phrase appears in some sections but not others.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as it creates consistent code language by adding a necessary pointer to Section 2303.2. (Vote: 11-3)

Final Hearing Results

G153-21	AS

G156-21

Original Proposal

IBC: 603.1

Proponents: Stephen Thomas, Colorado Code Consulting dba Shums Coda Associates, Inc., Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   - 1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in*shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*
   - 1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.
   - 1.3. Roof construction, including girders, trusses, framing and decking.

     Exceptions:

     1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
     2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A*roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.
   - 1.4. Balconies, porches, decks and exterior*stairways* not used as required exits on buildings three*stories* or less above grade plane.
2. Thermal and acoustical insulation, other than foam plastics, having a*flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.
3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.

10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.
28. Vapor Retarders as required by Section 1404.3

Reason: Vapor retarders are required to be installed in all climate zones. Many times the material is combustible. This has been questioned by some plans examiners when reviewing buildings of Type I and II construction. There is no language in the current code that specifically addresses this issue. We have developed this proposal to clarify that vapor retarders are permitted in these types of construction. The installation of the material does not have any significant impact on the building element in our opinion.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since most jurisdictions already permit the vapor retarder in exterior walls of Type I and II construction, this is just intended to clarify that the retarders can be installed and will not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as adding a pointer to Section 1404.3 for vapor retarders is appropriate. (Vote:12-2)

Final Hearing Results

G156-21	AS

G157-21

Original Proposal

IBC: 603.1.2

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

603.1.2 Piping <u>and plumbing fixtures</u>. The use of combustible piping materials <u>and plumbing fixtures</u> shall be permitted where installed in accordance with the limitations of the *International Mechanical Code* and the *International Plumbing Code*.

Reason: This change is to clarify that plastic plumbing fixtures are acceptable to be installed in Type I and Type II buildings. Fiberglass and acrylic shower compartments are often chosen for these types of buildings to speed construction and lower the cost of construction. Plastic water closets, bathtubs and lavatories are more durable than those of vitreous china and thus are more cost effective in the long run. However, not all jurisdictions are uniformly enforcing the building code because of the misconception that such fixtures are as combustible as common plastic materials. This is not true as the standards for plastic plumbing fixtures require testing for ignitability.
This proposal is submitted by the ICC Building Code Action Committee (BCAC) and developed in cooperation with the PMGCAC.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will decrease the cost of construction
Fiberglass and acrylic shower compartments are much more economical to install because there is a significant installation labor savings over field-constructed tile showers. Other plastic plumbing fixtures generally have a lower cost than their vitreous china counterparts and, being of lighter weight, may provide for some installation labor savings in handling alone.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as the proposal is consistent with current standards for plumbing fixtures. The proposal is a clarification of the provision. The committee did question if a 'prefabricated shower compartment' qualifies as a plumbing fixture. (Vote: 9-5)

Final Hearing Results

G157-21	AS

G158-21

Original Proposal

IBC: 1202.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1202.1 General. Buildings shall be provided with natural ventilation in accordance with Section 1202.5, or mechanical ventilation in accordance with the *International Mechanical Code*.~~Where the air infiltration rate in a~~~~*dwelling unit*~~ ~~is less than 5 air changes per hour where tested with a blower door at a pressure 0.2 inch w.c. (50 Pa) in accordance with Section R402.4.1.2 of the International Energy Conservation Code–Residential Provisions, the~~ ~~*dwelling unit*~~ Dwelling units complying with the air leakage requirements of the *International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code*. *Ambulatory care facilities* and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407 of the I*nternational Mechanical Code*.

Reason: This proposal is to align the IBC code text with requirements that already exist in the 2021 IMC as a result of M20-18 AS:
401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. *Dwelling units* complying with the air leakage requirements of the*International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 *occupancies* shall be ventilated by mechanical means in accordance with Section 407.No requirements are being added or deleted. This is simply a language coordination proposal.

This proposal is a BCAC proposal that was developed with the PMGCAC.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Bibliography: M20-18 AS

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The requirements already exist in the 2021 codes (2021 IMC). This proposal only makes the language for those requirements in both codes read the same. There are no increased or decreased of material or labor associated with this proposal as the requirements have not changed. Thus there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it coordinates with the International Mechanical Code Section 401.2. (Vote: 14-0)

Final Hearing Results

G158-21	AS

G159-21

Original Proposal

IBC: 1202.3, TABLE 1202.3

Proponents: Paul Duffy, Paul Duffy and Associates, American Chemistry Council - Spray Foam Coalition

2021 International Building Code

Revise as follows:

1202.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side *a*(*ttic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^1/_4$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing *underlayment* above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with either Item 5.1 or 5.2, and additionally Item 5.3.
   - 5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
     - 5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.
     - 5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed in accordance with Item 5.1.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the ~~R-values~~ R-value percentages in Table 1202.3 for condensation control.
     - 5.1.3. Where both air-impermeable and air-permeable insulation are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the ~~R-values~~ R-value percentages in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.
     - 5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5.2. In Climate Zones 1, 2 and 3, air-permeable insulation installed in unvented attics shall meet the following requirements:

5.2.1. A vapor diffusion port shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to $^{1}/_{600}$ of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor-permeable membrane in the vapor diffusion port shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.

5.2.5. The vapor diffusion port shall protect the attic against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (50 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3 units vertical in 12 units horizontal (3:12).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing, on top the attic floor, or on top of the ceiling.

5.2.9. Where only air-permeable insulation is used and is installed directly below the structural roof sheathing, air shall be supplied at a flow rate greater than or equal to 50 cubic feet per minute (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling.

5.3. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Exceptions:

1. Section 1202.3 does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals or art galleries.
2. Section 1202.3 does not apply to enclosures in Climate Zones 5 through 8 that are humidified beyond 35 percent during the three coldest months.

TABLE 1202.3 INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM *R*-VALUE OF AIR-IMPERMEABLE INSULATION EXPRESSED AS A PERCENTAGE OF TOTAL R-VALUE[a]
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5 10%
4C	R-10 20%
4A, 4B	R-1530%
5	R-2040%
6	R-2550%
7	R-3060%
8	R-3570%

a. Contributes to, but does not supersede, thermal resistance requirements for attic and roof assemblies in Section C402.2.1 of the International Energy Conservation Code.

Reason: Reason:

The existing table in Section 1202.3 was created at a time when the maximum insulation levels contemplated in the most extreme locations covered by the IECC was R-49. In more recent code cycles, insulation requirements have increased and many builders or designers are attempting to go “beyond code” minimums to achieve near zero, net-zero, or even zero energy consumption. The proponents believe the current requirements for minimum R-value of air-impermeable insulation laid out in Table 1202.3 should be expressed as a percentage of the total R-value for each assembly. This approach is intended to maintain a minimum surface temperature at the interface between impermeable and permeable insulation to avoid condensation that may occur in high R-value assemblies if the R-value of air-impermeable insulation is not proportionally increased.

The proposed version of Table 1202.3 was created using the total R-value required in each climate zone in Table 1202.3. The proposed version of Table 1202.3 expresses the required R-value of air-impermeable insulation as a percentage of the original R-value rather than absolute values. See calculations in the attached table.

Insulation for Condensation Control

Climate Zone	Air Impermeable Insulation Req'd	IECC Required Total R-Value	Percentage of Air Impermeable R-Value to Total Insulation R-Value
2B, 3B Tile Roof	0	38	0%
1, 2A, 2B, 3A, 3B, 3C	R-5	R-38	10%
4C	R-10	R-49	20%
4A, 4B	R-15	R-49	30%
5	R-20	R-49	40%
6	R-25	R-49	50%
7	R-30	R-49	60%
8	R-35	R-49	70%

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the table in the section so it can be more broadly applied using sound building science principles.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it coordinates with the International Energy Code. (Vote: 11-2)

Final Hearing Results

G159-21 AS

G160-21

Original Proposal

IBC: 1202.3

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Building Code

Revise as follows:

1202.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side *a*(*ttic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^{1}/_{4}$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing *underlayment* above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with either Item 5.1 or 5.2, and additionally Item 5.3.
   5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
      5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.
      5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed in accordance with Item 5.1.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table 1202.3 for condensation control.
      5.1.3. Where both air-impermeable and air-permeable insulation are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the R-values in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.
      5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5.2. In Climate Zones 1, 2 and 3, air-permeable insulation installed in unvented attics shall meet the following requirements:

5.2.1. A vapor diffusion port shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to ~~1/600~~ 1/150 of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor-permeable membrane in the vapor diffusion port shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.

5.2.5. The vapor diffusion port shall protect the attic against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (50 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3 units vertical in 12 units horizontal (3:12).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing, on top the attic floor, or on top of the ceiling.

5.2.9. Where only air-permeable insulation is used and is installed directly below the structural roof sheathing, air shall be supplied at a flow rate greater than or equal to 50 cubic feet per minute (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling.

5.3. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Exceptions:

1. Section 1202.3 does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals or art galleries.
2. Section 1202.3 does not apply to enclosures in Climate Zones 5 through 8 that are humidified beyond 35 percent during the three coldest months.

Reason: I got it wrong in my original proposal. There was an error in converting the measurements. The original work was based on 1:300 and the intention was to double the vent area… Doubling the vent area is really 1:150 not 1:600.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost increase is due to the increase in vent area. The cost increase is small as it increases the size of the vent area - it does not require the addition of vents, only an increase in the size of the vents. Note that having too little vent area can lead to problems that will have associated costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it addresses an error that occurred in G119-18. The 1/150 ratio is for vapor diffuser ports and follows recommended industry practices. (Vote: 14-0)

Final Hearing Results

G160-21	AS

G169-21

Original Proposal

IBC: 1206.2, 1206.3

Proponents: David Dong, Veneklasen Associates, Inc., Veneklasen Associates, Inc. (wdong@veneklasen.com)

2021 International Building Code

Revise as follows:

1206.2 Airborne sound. Walls, partitions and floor-ceiling assemblies separating *dwelling units* and *sleeping units* from each other or from public or service areas shall have a sound transmission class of not less than 50 where tested in accordance with ASTM E90, or have a Normalized Noise Isolation Class (NNIC) rating of not less than 45 if field tested, in accordance with ASTM E336 for airborne noise. Alternatively, the sound transmission class of walls, partitions and floor-ceiling assemblies shall be established by engineering analysis based on a comparison of walls, partitions and floor-ceiling assemblies having sound transmission class ratings as determined by the test procedures set forth in ASTM E90. <u>Engineering analysis shall be performed by a *registered design professional*.</u> Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1206.3 Structure-borne sound. Floor-ceiling assemblies between *dwelling units* and *sleeping units* or between a *dwelling unit* or *sleeping unit* and a public or service area within the structure shall have an impact insulation class rating of not less than 50 where tested in accordance with ASTM E492, or have a Normalized Impact Sound Rating (NISR) of not less than 45 if field tested in accordance with ASTM E1007. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492. <u>Engineering analysis shall be performed by a *registered design professional*.</u>

Reason: This section of the code is proposed to ensure that the individual completing the engineering analysis has the necessary qualifications to provide accurate engineering judgment in acoustical design. This stipulation is necessary because of the frequency of permitting and construction that occurs using non-code-compliant assemblies as a result of inaccurate engineering judgments. Architects, contractors, structural engineers, mechanical engineers, and other licensed engineers do not have the specialization required to assess assembly acoustical performance and therefore should not be offering these judgments. Examples of design failures include:

- BTC Residential, LLC vs. Hacker Industries. The referenced tested floor-ceiling assembly was modified by changing the type of truss used from wood to wood-steel composite and changed resilient channel product. The assembly failed to meet minimum code performance post-construction. The floor matting manufacturer was sued but the case was settled in the manufacturer's favor as it was demonstrated that the failure was due to design errors.
- Homeowners successfully sued the developer of a project in Minneapolis due to failing impact isolation of the floor-ceiling assembly. It was demonstrated that the acoustical failure was due to excess floor excitation as a result of long joist span and use of double-leg resilient channels in lieu of single-leg resilient channels.
- Walls permitted under GA File WP 3245 (and similar), with a shear layer added between the stud and the resilient channel, sandwiching the channel between the shear layer and gypsum board layer. This configuration reduces performance of the assembly below the required STC-50 by reducing the channel's effectiveness. This exact design configuration was included architectural drawings dated December 2020 and identified as being code-compliant to the AHJ, even though it is not.
- Walls permitted under GA File WP 1021 (and similar), where the stud gauge is reduced below 24 inches on center and/or the stud gauge is heavier than 25 gauge. The change to stud gauge or spacing reduces the wall's performance below the required STC-50.
- Double-stud walls permitted under GA file WP 3820 (and similar), where shear layers are installed in the interior cavity rather than on the exterior of the wall. With an interior shear layer on each side of the cavity, the STC rating falls below 50.
- Walls permitted under GA file WP 3239 (and similar), where two 1-hour walls are placed side-by-side to create a 2-hour assembly (i.e. for townhome construction). With a narrow airspace between the two walls (less than 3 inches), the rating of the combined assemblies is below 50.

This language is parallel to section 909.9.

Bibliography: Shafer, B., “Laboratory sound transmission loss testing for steel-framed partitions II: Stud spacing and steel material properties” The Journal of the Acoustical Society of America 146, 2766 (2019); https://doi.org/10.1121/1.5136579.

LoVerde, J., Dong, W., "Quantitative comparisons of resilient channel design and installation in single wood stud walls," Proceedings of the 10th International Congress on Acoustics, ICA 2010, Sydney.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This code change does not represent a cost impact to projects since there are existing libraries of tested assemblies that can be referenced and used for projects without requiring engineering judgments or the hiring of an acoustical design professional.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this is the correct generic reference for requiring expertise for design (see the committee action on G168-21). This will allow for either compliance with the standard or engineering analysis. (Vote 13-1)

Final Hearing Results

G169-21 AS

G171-21

Original Proposal

IBC: 1208.3, 1208.4

Proponents: Jenifer Gilliland, Washington Association of Building Officials (jenifer.gilliland@seattle.gov); Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

[BG] DWELLING UNIT, EFFICIENCY. A *dwelling unit* where all permanent provisions for living, sleeping, eating and cooking are contained in a single room.

Add new text as follows:

1208.3 Dwelling unit size. Dwelling units shall have a minimum of 190 square feet (17.7 m^2~~)~~ of habitable space.

Revise as follows:

1208.4 ~~**1208.3**~~ **Room area.** Every *dwelling unit* shall have not less than one room that shall have not less than 120 square feet (11.2 m^2) of *net floor area*. *Sleeping units* and other habitable rooms of a *dwelling unit* shall have a *net floor area* of not less than 70 square feet (6.5 m^2).

Exception: Kitchens are not required to be of a minimum floor area.

1208.5 ~~**1208.4**~~ **Efficiency dwelling units.** *Efficiency dwelling units* shall conform to the requirements of the code except as modified herein:

1. The ~~unit~~ unit's habitable space shall ~~have a living room of not less than 190 square feet (17.7 m²) of floor area~~ comply with Sections 1208.1 through 1208.4.
2. The unit shall be provided with a separate closet.
3. For other than *Accessible*, Type A and Type B dwelling units, the unit shall be provided with a kitchen sink, cooking appliance and refrigerator, each having a clear working space of not less than 30 inches (762 mm) in front. Light and *ventilation* conforming to this code shall be provided.
4. The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.

Reason: This proposal standardizes the minimum size requirements for all dwelling units. The code as currently written can be interpreted to allow a one-bedroom unit to be smaller than an efficiency dwelling unit. This change makes it clear that a dwelling unit and efficiency dwelling unit are subject to the same size limitations. It also clarifies that sleeping units are subject to the same minimum size requirements as habitable rooms in dwelling units.

Cost Impact: The code change proposal will decrease the cost of construction
This code change would decrease the cost of developing a one bedroom unit because it will not be treated differently from an EDU as far as size is concerned. It would also allow developers more choices of unit type.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it coordinated the requirements for area in dwelling units and efficiency dwelling units. (Vote: 13-0)

Final Hearing Results

G171-21	AS

G173-21

Original Proposal

IBC: 1201.1, 1211 (New), 1211.1 (New), UL Chapter 35 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

Add new text as follows:

SECTION 1211 UV GERMICIDAL IRRADIATION SYSTEMS

1211.1 General. . Where ultraviolet (UV) germicidal irradiation systems are provided they shall be *listed* and *labeled* in accordance with UL 8802 and installed in accordance with their listing and the manufacturer's instruction.

Revise as follows:

1201.1 Scope. The provisions of this chapter shall govern ventilation, temperature control, lighting, *yards* and *courts*, sound transmission, room dimensions, surrounding materials, ~~and~~ rodentproofing and UV germicidal irradiation systems associated with the interior spaces of buildings.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 8802-2020	Outline of Investigation for Germicidal Systems

Reason: The use of ultraviolet (UV) light solutions for sanitization and germicidal purposes have increased in order to combat COVID-19. UVC exposure poses serious safety risks to skin and eyes. UL developed UL 8802 to address the evaluation of these devices in order to provide minimum safety requirements intended to minimize risks.
The requirements in UL 8802 apply to germicidal systems intended to expose surfaces within an unoccupied area with ultraviolet (UV) energy where the exposure dose would otherwise pose a risk of personal injury to occupants. System components include UV emitters, switches, sensors and other controls acting as site or equipment safeguards. These requirements only address permanently mounted (i.e. fixed) equipment intended to be installed and operated in non-residential locations. The installation and operating instructions are considered an integral system component. A system may also include devices that produce visible light.

Cost Impact: The code change proposal will increase the cost of construction
This proposal has the potential to increase construction costs compared to the installation of non-listed UV germicidal irradiation systems that have not been investigated for safety by an approved certification organization.

Staff Note: G173-21 and G174-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it provides guidance for UV germicidal irradiation systems where they are provided. There was a concern that UL 8802 is a outline, not a standard. (Vote: 12-1)

Final Hearing Results

G173-21	AS

G176-21

Original Proposal

IBC: SECTION 2703 (New), 2703.1 (New), 2703.2 (New), 2703.2.1 (New), 2703.3 (New), UL Chapter 35 (New), NFPA Chapter 35 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

Add new text as follows:

SECTION 2703
LIGHTNING PROTECTION SYSTEMS

2703.1 General. Where provided, lightning protection systems shall comply with Sections 2703.2 through 2703.3.

2703.2 Installation. Lightning protection systems shall be installed in accordance with NFPA 780 or UL 96A. UL 96A shall not be utilized for buildings used for the production, handling, or storage of ammunition, explosives, flammable liquids or gases, and other explosive ingredients including dust.

2703.2.1 Surge protection. Where lightning protection systems are installed, surge protective devices shall also be installed in accordance with NFPA 70 and either NFPA 780 or UL 96A, as applicable.

2703.3 Interconnection of systems. All lightning protection systems on a building or structure shall be interconnected in accordance with NFPA 780 or UL 96A, as applicable.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 96A-2016	Standard for Installation Requirements for Lightning Protection Systems

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 780-20	Standard for the Installation of Lightning Protection Systems

Reason:

- Requirements pertaining to Lightning Protection Systems are **not** currently found within the building code.
- This code change does not require the installation of lightning protection systems, but simply provides guidance to those that are installing lightning protection.
- NFPA 780 and UL 96A are two standards that are widely used within the industry, and are currently used for installations but are not very well known to code officials. These standards are in harmony with the provisions of the National Electrical Code, NFPA 70.
- UL 96A can be used for the installation and inspection of many lightning protection systems but the standard has limitations and these are identified in this proposal.
- This proposal is simply intended to provide the code official with assistance in addressing the installation of these types of systems if they are installed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

These standards are already used with installations today so there would not be any change in the cost of construction.

Staff Note: G175-21 and G176-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as the committee felt that this provided direction and criteria if you wanted to add a lightning protection systems. The committee preferred this to the mandatory requirements in G175-21. (Vote: 13-0)

Final Hearing Results

G176-21	AS

G177-21

Original Proposal

IBC: 3001.2

Proponents: Kevin Brinkman, National Elevator Industry, Inc., National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Building Code

Revise as follows:

3001.2 Emergency elevator communication systems ~~for the deaf, hard of hearing and speech impaired.~~ An emergency elevator ~~two-way~~ communication system shall be provided~~. The system shall provide~~ that includes both visual ~~visible text~~ and audible communication modes ~~that meet all of the following~~ complying with the requirements in ASME A17.1/CSA B44~~.~~:

1. ~~When operating in each mode, include a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.~~
2. ~~Is operational when the elevator is operational~~.
3. ~~Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.~~

Reason: The title was modified because this communication system needs to be useable by all people, not just the deaf, hard of hearing and speech impaired.
Added "elevator" to clarify that this applies to the communication system in the elevator since the title is not part of the requirement.

Deleted "two-way" for consistency with ASME A17.1/CSA B44 language.

The communication system is part of the elevator system requirements and the technical criteria for the communication system is provided in ASME A17.1/B44 Safety Code for Elevators and Escalators. As part of the elevator system, the communication system is inspected by elevator inspectors; therefore, the requirements belong in the elevator code. The requirements as currently written in the IBC are no longer needed because the elevator code contains significantly more detailed requirements to make the system accessible to the deaf, hard of hearing, and speech impaired. This proposal retains the base requirement for the system in the IBC but references the technical requirements in ASME A17.1-2019/CSA B44:19 elevator code which is referenced in IBC Chapter 35. The requirements in ASME A17.1-2019/CSA B44:19 were developed for consistency with the guidelines in the ADA Title III which is the regulation specifically for effective communication with the deaf, hard of hearing and speech impaired.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will neither increase nor decrease the cost of construction because the requirements in the A17.1-2019/CSA B44:19 code already need to be complied with per Section 3001.3 Referenced Standards.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt that the revised text could be read to just apply to emergency elevators rather than all elevators. The language in the proposal should emphasize that the two-way communication in the elevator car is for everyone, including persons who have speaking or hearing disabilities. All of the testifiers seem to have the same intent - they need to work together to resolve the conflicts in the current language. ASME A17.1 has included criteria for these systems. The proposal needs to provide more specific direction. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Kevin Brinkman, National Elevator Industry, Inc., National Elevator Industry, Inc. (klbrinkman@neii.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

3001.2 Elevator emergency ~~Emergency elevator~~ communication systems ~~for the deaf, hard of hearing and speech impaired.~~ An elevator emergency two-way communication system shall be provided~~. The system shall provide visible text~~that includes both visual and audible communication modes ~~that meet all of the following requirements~~ complying with the requirements in ASME A17.1/CSA B44. They system shall provide a means to enable authorized personnel to verify:

1. The presence of someone in the car.
2. That the person(s) is trapped.

Once an entrapment is verified, the system shall enable authorized personnel to:

1. Determine if assistance is needed. ~~When operating in each mode, include a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.~~
2. Communicate when help is on the way. ~~Is operational when the elevator is operational~~.
3. Communicate when help arrives on site. ~~Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.~~

Commenter's Reason: This code requirement was first introduced in the 2018 edition and it was revised in the 2021 edition in an effort to clarify the requirements; however, as written it does not provide the necessary technical requirements to ensure consistent implementation. Consistent implementation is vital to making the system usable by all people, not just those with hearing or speech loss. Traditionally, the building code has provided the scoping for elevators and the technical criteria for the elevators has been in the ASME A17.1/CSA B44 Safety Code for Elevators and Escalators (elevator code). The 2019 edition of the elevator code includes significant changes to address the concerns raised by the proponent of the original code change to the IBC and provides the needed technical guidance for the elevator manufacturer and the elevator inspection to ensure consistent implementation. The ASME committee that developed the requirements invited the proponent of the original IBC requirement and other members representing the disability community to participate in the code process. The resulting requirements were chosen in order to serve the broadest number of people who may not be able to communicate verbally. Suggestions for ASL and other methods were not as desirable because they would be limited to a small portion of the potential users. As written, the elevator code requirements also make the system more accessible to people who may speak a different language or who cannot speak for any due to a medical condition.
A key element of the new ASME requirements is the provision for a means (video) to show the entire floor area of the car. The concern raised by the proponent and with entrapments in the past that were not immediately answered because there was no response from the car. These concerns are alleviated by the visual means because the authorized person at the call center can see that someone is in the car and immediately dispatch help. This means would verify the presence of the person whether they could speak or not, including identifying someone who has suffered a medical situation and may be lying on the floor. The ASME requirements also provide for a means to ask question and receive responses from the persons in the car usually both audio and visual means. This can be in the form of questions with “yes” or “no” answers that can be answered by pressing the appropriate button or by providing a means in the car to text answers. The attached sheet shows one example of how this is currently being addressed in the field. The current language in 3001.2 only requires the system to be operational when the elevator is operational. Most entrapments occur because the elevator goes out of service but based on the 3001.2 language the system is not required to be functional at that time. The ASME language requires the system to be operational 24 hours per day/7 days a week which corrects this issue. .

Elevator emergency communication systems have been in the elevator code for many years. It is important to note that the intent of the system is to notify authorized personnel who can take action in case of an elevator entrapment. It is not designed for lengthy conversation.

The communication system is required to be directed to authorized personnel 24 hours per day/7 days a week. The system must automatically relay the building location and elevator car number to authorized personnel without input from the passenger. The system is also required to do a daily self-check to ensure it is operating properly. The system does not automatically direct calls to the 911 system because the sheer volume of calls would overwhelm that system. Authorized personnel at call centers receive tens of millions of calls per year. Studies have shown that over 90% of these calls are nuisance calls (accidental due to crowded elevators, kids playing pranks, etc.).

The revised proposal below addresses concerns raised by opponents and the committee to the previous NEII proposal while providing more guidance for designers and building officials. It also aligns with the requirements in the elevator code. Specifically, this revised proposal:

· Updates the title to clarify that the system is for use by all passengers, not just those with hearing or speech loss.

· Relocates the word "elevator" before emergency two-way communications in the title and the text based on a concern expressed by the committee member that it could be perceived to only apply to emergency elevators, even though the original title had "elevator" after "emergency".

· Retains "two-way" based on a concern raised by one of the opponents even though it is already addressed in the elevator code.

· Adds specific functions that the system must be able to provide to assess whether someone is in the car and that they are entrapped. Also provides the capability to determine if assistance is needed, to communicate when help is on the way and when help has arrived on site. These are the basic steps that are needed to assess the situation and take appropriate action.

· Directs users of the code to the elevator code requirements for a more detailed description of the system requirements.

Two-Way Elevator Emergency Communications Visual Device

For compliance to the latest codes

The device gives riders the option to communicate visually by answering on-screen questions.

The Two-Way Emergency Communications Visual Device easily integrates into your Schindler elevator.

Two-Way Emergency Communications Visual Device

The ASME A17.1-2019 and IBC 2018 codes require in-elevator two-way emergency communication systems for the hearing impaired.

The Two-Way Emergency Communications Visual Device is easily integrated into your Schindler elevator during the construction process and complies with these codes.

Easy-to-use interface

In the event of an emergency, riders can call for help using the call/phone button inside the elevator on the Two-Way Emergency Communications Visual Device.

Once the call is made, riders have the option to communicate with dispatchers via standard voice communications, or visually by answering questions that appear on the device's easy-to-read screen.

To answer the Yes or No questions on the device, riders simply use its red and green buttons.

Video camera for visual assessment inside the elevator

The Two-Way Emergency Communications Visual Device also includes a video camera that becomes activated when a rider makes a call for help using its call/phone button. The video camera quickly provides dispatchers a visual assessment of the situation inside of the elevator.

Programmable connectivity

The device can be programmed to connect to the Schindler Customer Service Network, or to another point of contact as designated by the building owner or operations manager.

For more information, please contact your Schindler sales representative.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The proposal will neither increase nor decrease the cost of construction because the requirements in the A17.1-2019/CSA B44:19 code already need to be complied with per Section 3001.3 Referenced Standards and the proposal is clarifying requirements to ensure more consistent implementation.

Final Hearing Results

G177-21	AMPC1

G178-21

Original Proposal

IBC: 3001.2

Proponents: Andrew Cid, BARRIER FREE SOLUTIONS FOR THE DEAF AND HARD OF HEARING, BARRIER FREE SOLUTIONS FOR THE DEAF AND HARD OF HEARING

2021 International Building Code

Revise as follows:

3001.2 Emergency elevator communication systems for the deaf, hard of hearing and speech impaired. An emergency two-way communication system shall be provided <u>in each elevator car</u>. The system shall provide visible text and audible modes that meet all of the following requirements:

1. When operating in each mode, include a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.
2. Is operational when the elevator is operational.
3. Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.

Reason: This proposal is submitted as there is no new standard published, as of this writing, under the ASME A17.1 in support of IBC 2018 Section 3001.2. This code proposal also provides additional direction and clarification for industry. Underlined wording is added text to capture the intent of the proposal. This proposal clarifies as to what type of feature and assistance is required and shall be provided regards to the utilization of a text-based system (consisting of keyboard, visual indicators and button indicators) by an entrapped Deaf or Hard of Hearing passenger(s). I have been working with a dedicated group of industry professionals who have been working hard to develop an A17.1 standard for Section 3001.2. My participation in these ASME efforts for the past 6 years have been exciting and productive in attempting to improve the standard to include criteria for these systems. However, I will continue working to provide assistance to industry, to Fire/Life Safety and First Responders in their jobs in helping others, and to provide access to 50M Deaf & Hard of Hearing citizens. I hope the IBC committee, industry representatives, and the ICC voters, especially the professional First Responders, agree with this proposal. If approved, this will be effective 2024 and the next A17.1 will hopefully be in place by then to support Section 3001.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of requirements for elevator cars, and is already required.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because two-way communication is already required by ASME A17.1 in each elevator car. This change just re-emphasizes that requirement. (Vote: 14-0)

Final Hearing Results

G178-21 AS

G180-21

Original Proposal

IBC: 713.14, 716.2.6.1, 3002.1, 3002.1.1, 3002.1.2, 3002.2, 3002.6, SECTION 3006, 3006.1, 3006.2, 3006.3

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

SECTION 3002
HOISTWAY ENCLOSURES

Revise as follows:

3002.1 Hoistway ~~enclosure~~ protection. ~~Elevator, dumbwaiter and other hoistway enclosures shall be *shaft enclosures* complying with Sections 712 and 713.~~ A hoistway for elevators, dumbwaiters and other vertical access devices shall be comply with Sections 712 and 713. Where the hoistway is required to be enclosed it shall be constructed as a shaft enclosure in accordance with Section 713.

3002.1.1 Opening protectives. Openings in fire-resistant rated hoistway enclosures shall be protected as required in Chapter 7.

Exception: The elevator car doors and the associated elevator hoistway ~~enclosure~~ doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I Emergency Recall Operation.

3002.1.2 Hardware. Hardware on ~~opening protectives~~ elevator hoistway doors shall be of an *approved* type installed as tested, except that *approved* interlocks, mechanical locks and electric contacts, door and gate electric contacts and door-operating mechanisms shall be exempt from the fire test requirements.

3002.2 Number of elevator cars in a hoistway. Where four or more elevator cars serve all or the same portion of a building, the elevators shall be located in not fewer than two separate fire-resistance rated hoistways. Not more than four elevator cars shall be located in any single fire-resistance rated hoistway enclosure.

3002.6 Prohibited doors or other devices. Doors or other devices, other than ~~hoistway doors and~~ the elevator car door and the associated elevator hoistway doors, shall be prohibited at the point of access to an elevator car unless such doors or other devices are readily openable from inside the car ~~side~~ without a key, tool, special knowledge or effort.

SECTION 3006
ELEVATOR LOBBIES AND HOISTWAY ~~OPENING~~ DOOR PROTECTION

3006.1 General. ~~Elevator hoistway openings and enclosed~~ Enclosed elevator lobbies and elevator hoistway door protection shall be provided in accordance with the following:

1. Where elevator hoistway door ~~opening~~ protection is required by Section 3006.2, such protection shall be provided in accordance with Section 3006.3.
2. Where enclosed elevator lobbies are required for underground buildings, such lobbies shall comply with Section 405.4.3.
3. Where an *area of refuge* is required and an enclosed elevator lobby is provided to serve as an *area of refuge*, the enclosed elevator lobby shall comply with Section ~~1009.6~~ 1009.6.4.
4. Where fire service access elevators are provided, enclosed elevator lobbies shall comply with Section 3007.6.

5. Where occupant evacuation elevators are provided, enclosed elevator lobbies shall comply with Section 3008.6.

3006.2 Elevator hoistway door ~~Hoistway opening~~ protection required. Elevator hoistway ~~door openings~~ doors shall be protected in accordance with Section 3006.3 where an elevator hoistway connects more than three *stories*, is required to be enclosed within a *shaft enclosure* in accordance with Section 712.1.1 and any of the following conditions apply:

1. The building is not protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The building contains a Group I-1, Condition 2 occupancy.
3. The building contains a Group I-2 occupancy.
4. The building contains a Group I-3 occupancy.
5. The building is a high rise and the elevator hoistway is more than 75 feet (22 860 mm) in height. The height of the hoistway shall be measured from the *lowest floor* to the highest floor of the floors served by the hoistway.

Exceptions:

1. Protection of elevator hoistway ~~door openings~~ doors are ~~–~~is not required where the elevator serves only *open parking garages* in accordance with Section 406.5.
2. Protection of elevator hoistway ~~door openings~~ doors are ~~is~~ not required at the level(s) of exit discharge, provided that the level(s) of exit discharge is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. ~~Enclosed elevator lobbies and protection~~ Protection of elevator hoistway ~~door openings~~ doors are not required on levels where the elevator hoistway door opens to the exterior.

3006.3 Elevator hoistway door ~~Hoistway opening~~ protection. Where Section 3006.2 requires protection of the elevator hoistway door ~~opening~~, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway ~~*shaft enclosure*~~ doors from each floor by *fire partitions* in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for *corridor* walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway ~~*shaft enclosure*~~ doors from each floor by *smoke partitions* in accordance with Section 710 where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors or other devices shall be provided at each elevator hoistway door ~~opening~~ in accordance with Section 3002.6. Such door or other devices shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.

713.14 Elevator, dumbwaiter and other hoistways. ~~Elevator, dumbwaiter and other hoistway enclosures shall be constructed in accordance with Sections 712 and~~ A hoistway for elevators, dumbwaiters and other vertical devices shall comply with Section 712. Where the hoistway is required to be enclosed, it shall be constructed as a shaft enclosure in accordance with Section 713, and Chapter 30.

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. The elevator car doors and the associated elevator hoistway ~~enclosure~~ doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.

Reason: The intent of this proposal is consistent terminology for elevator protection. The current text is very inconsistent. This is not intended to have any technical changes.

The elevator industry considers an elevator hoistway the vertical movement of that device, whether it be in a rated enclosure, in non-rated enclosure, or not enclosed at all. The photos are examples of hoistways that are the non-rated enclosure and the open hoistway.

Example of elevator hoistways that are not in rated enclosures.

The intent of this proposal is consistent terminology for elevator protection. The current text is very inconsistent. This is not intended to have any technical changes.The elevator industry considers an elevator hoistway the vertical movement of that device, whether it be in a rated enclosure, in non-rated enclosure, or not enclosed at all. The photos are examples of hoistways that are the non-rated enclosure and the open hoistway.


Examples of doors or other devices in front of associated elevator entrance doors – see Section 3002.6 and 3006.3 Item 3

This proposal is submitted by the ICC Building Code Action Committee (BCAC) in cooperation with the ICC Fire Code Action Committee (FCAC).
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The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of the terminology for elevator hoistways, and shaft protection and the associated elevator doors and has no changes to the construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it is applies consistent terminology for elevators and their protections. The cleanups is helpful and should simplify compliances. There was a question about the area of refuge reference in Section 3006.1 Item 3, but Section 1009.6.4 this is the correct reference for area of refuge separation, which is what Section 3006.1 is about. (Vote: 14-0)

Final Hearing Results

G180-21 AS

G182-21

Original Proposal

IBC: 1020.2.1 (IFC[BE] 1020.2.1), 3006.2, 3006.2.1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

3006.2 ~~Hoistway opening protection~~ Elevator hoistway door required. Elevator hoistway doors ~~door openings~~ shall be protected in accordance with Section 3006.3 where an elevator hoistway connects more than three *stories*, is required to be enclosed within a *shaft enclosure* in accordance with Section 712.1.1 and any of the following conditions apply:

1. The building is not protected throughout with an*automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The building contains a Group I-1, Condition 2 occupancy.
3. The building contains a Group I-2 occupancy.
4. The building contains a Group I-3 occupancy.
5. The building is a high rise and the elevator hoistway is more than 75 feet (22 860 mm) in height. The height of the hoistway shall be measured from the *lowest floor* to the highest floor of the floors served by the hoistway.
6. The elevator hoistway door is located in the wall of a corridor required to be fire-resistance rated in accordance with Section 1020.1.

Exceptions:

1. Protection of elevator hoistway doors ~~door openings~~ is not required where the elevator serves only *open parking garages* in accordance with Section 406.5.
2. Protection of elevator hoistway doors ~~door openings~~ is not required at the level(s) of exit discharge, provided that the level(s) of exit discharge is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. ~~Enclosed elevator lobbies and protection~~ Protection of elevator hoistway doors ~~door openings~~ are not required on levels where the elevator hoistway opens to the exterior.

Delete without substitution:

~~**3006.2.1 Rated corridors.** Where *corridors* are required to be fire-resistance rated in accordance with Section 1020.2, elevator hoistway openings shall be protected in accordance with Section 3006.3.~~

Revise as follows:

1020.2.1 Hoistway ~~opening~~ protection. Elevator hoistway doors in elevators hoistway enclosures required to be fire resistance rated shall be protected in accordance with Section 716. Elevator hoistway doors ~~openings~~ shall also be protected in accordance with Section3006.2 ~~3006.2.1~~.

Reason: Elevator doors that open into a rated corridor have to meet both the fire partition and fire barrier requirements. The options for elevator door protection in Section 3006.3 would be a viable option, so Section 3006.2.1 could be moved up as Item 6 in Section 3006.2.
The change to 1020.2.1 is a pointer to both the rated corridor and elevator hoistway door protection requirements.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of current requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: **3006.2.1 Rated corridors.** Where *corridors* are required to be fire-resistance rated in accordance with Section 1020.2, elevator hoistway openings shall be protected in accordance with Section 3006.3.

Committee Reason: The modification retained the current language in Section 3006.2.1. This modification was presented as needed because the provisions in the FS proposals related to elevator hoistway doors have not been decided yet. Elevator hoistway doors may be needed in 2 and 3 story Group R-2 occupancies. The proposal was approved as this cleans us the language for elevator hoistway doors and should make the code easier to understand. (Vote: 14-0)

Final Hearing Results

G182-21 AM

G183-21 Part I

Original Proposal

PART I- IBC: SECTION 3006, 3006.3, 3007.6.2, 3007.6.3, 3008.6.1, 3008.6.2, 3008.6.3, 3008.6.3.1, 3008.6.3.2
PART II - IBC: 708.4.1 (New), 709.4.2, 710.4.1 (New)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

SECTION 3006
ELEVATOR LOBBIES AND HOISTWAY ~~OPENING~~ DOOR PROTECTION

3006.3 ~~Hoistway opening~~ Elevator hoistway door protection. Where Section 3006.2 requires protection of the elevator hoistway ~~door opening~~ doors, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway ~~*shaft enclosure*~~ doors from each floor ~~by~~ with *fire partitions* in accordance with Section 708. In addition, doors protecting openings in the ~~elevator lobby enclosure walls~~ fire partitions shall comply with Section 716.2.2.1 ~~as required for *corridor* walls~~. Penetrations of the ~~enclosed elevator lobby~~ fire partitions by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway ~~*shaft enclosure*~~ doors from each floor ~~by~~ with *smoke partitions* in accordance with Section 710 ~~where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2~~. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the ~~enclosed elevator lobby~~ smoke partitions by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such door shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.

SECTION 3007
FIRE SERVICE ACCESS ELEVATOR

Revise as follows:

3007.6.2 Elevator lobby ~~Lobby~~ enclosure. The fire service access elevator lobby shall be ~~enclosed~~ separated from each floor with a *smoke barrier* in accordance with Section 709 ~~having a *fire-resistance rating* of not less than 1 hour~~, except that lobby doorways shall comply with Section 3007.6.3.

Exception: Enclosed fire service access elevator lobbies are not required at the *levels of exit discharge*.

3007.6.3 ~~Lobby~~ Elevator lobby doorways. Other than doors to ~~the hoistway,~~ elevator control room or elevator control space, each door ~~doorway to an enclosed fire service access elevator lobby~~ in the smoke barrier shall be provided with a $^3/_4$-hour *fire door assembly* complying with Section 716. ~~The~~ Such *fire door assembly* shall comply with the smoke and draft control door assembly requirements of Section 716.2.2.1.1 and be tested in accordance with UL 1784 without an artificial bottom seal.

SECTION 3008
OCCUPANT EVACUATION ELEVATORS

Revise as follows:

3008.6.1 Access to interior exit stairway or ramp. The occupant evacuation elevator lobby shall have *direct access* from the enclosed elevator lobby to an *interior exit stairway or ramp*.

Exceptions:

1. Access to an *interior exit stairway or ramp* shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section ~~716.2.2.1~~ 716.2.2.1.1.
2. Elevators that only service an *open parking garage* and the elevator lobby of the building shall not be required to provide *direct access*.

3008.6.2 Elevator lobby ~~Lobby~~ enclosure. The occupant evacuation elevator lobby shall be ~~enclosed~~ separated from each floor with a *smoke barrier* in accordance with Section 709 ~~having a *fire-resistance rating* of not less than 1 hou~~r, except that lobby doorways shall comply with Section 3008.6.3.

Exception: Enclosed occupant evacuation elevator lobbies are not required at the *levels of exit discharge*.

3008.6.3 Elevator lobby ~~Lobby~~ doorways. Other than the doors to ~~the hoistway,~~ elevator machine rooms, machinery spaces, control rooms and control spaces ~~within the lobby enclosure~~ in the *smoke barrier*, each doorway to an occupant evacuation elevator lobby shall be provided with a $^{3}/_{4}$-hour *fire door assembly* complying with Section 716. ~~The~~ Such *fire door assembly* shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1.1 and be tested in accordance with UL 1784 without an artificial bottom seal.

3008.6.3.1 Vision panel. A vision panel shall be installed in each *fire door assembly* ~~protecting the lobby doorway~~ in the smoke barrier. The vision panel shall consist of fire-protection-rated glazing, shall comply with the requirements of Section 716 and shall be located to furnish clear vision of the occupant evacuation elevator lobby.

3008.6.3.2 Door closing. Each *fire door assembly* ~~protecting the lobby doorway~~ in the smoke barrier shall be automatic-closing upon receipt of any fire alarm signal from the *emergency voice/alarm communication system* serving the building.

Reason: The intent of this proposal is to clarify lobby protection requirements – which walls are fire barriers, fire partitions or smoke barriers. This will also clarify what requirements are applicable for the elevator hoistway doors vs. the doors in the other walls of the lobby protection. The current language is inconsistent for the locations where elevator lobbies are specified.This protection of elevator lobbies is a combination of the elevator hoistway and exit stairway (direct access to a stairway is required for fire service an occupant evacuation elevator lobbies) shaft enclosure/fire barriers and the fire partitions or smoke barriers required for lobbies (405.4.3, 3006.3, 3007.6.2 and 3008.6.2) The intent of new 708.4.1 and revised 709.4.2 is to clarify that the fire partitions/smoke barrier criteria is not applicable to all the walls of the elevator lobby since the vertical shaft/fire barrier protections is adequate. Fires typically happen in the occupied portions of the buildings, not within the elevator shaft or the stairway. In addition, in situations where an elevator lobby is provided, the elevator shafts are double protected from smoke intrusion from a fire on the floor.

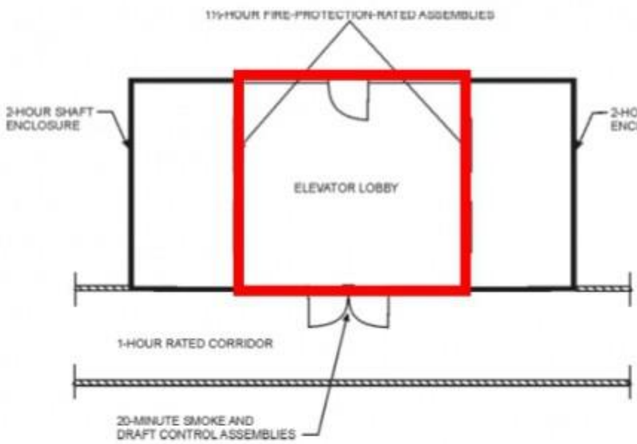

Diagram for elevator lobby

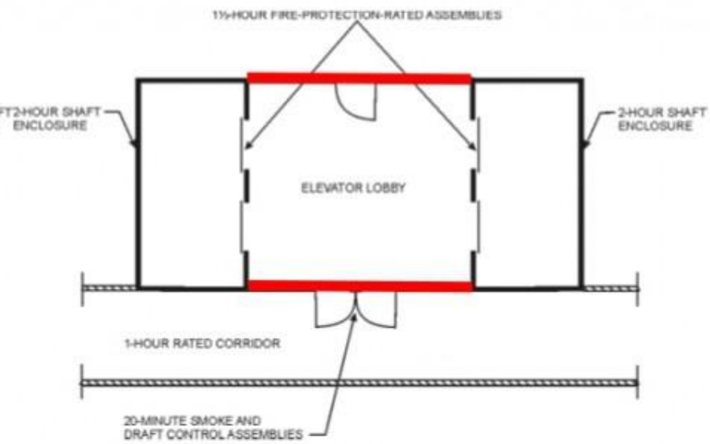

Diagram for which walls are fire partitions, smoke partitions or smoke barriers

Provisions for horizontal continuity are addressed for smoke barriers that surround elevator lobbies or areas of refuge. The same horizontal continuity should be addressed for elevator lobbies enclosed with fire partitions in Section 3006.3 Item 1 or smoke partitions in Section 3006.3 Item 2. The movement of 'smoke barrier wall' just assures a minimum fire resistance rating. The last sentence in 709.4.2 is not needed with the clarification of which walls meet which requirements in Chapter 30.The reference to sprinklers is not needed in Section 3006.3 Item 2, because this is already a limitation in Section 3006.2. Taking it out makes this item easier to read. In addition, this could currently be read to not allow smoke barriers to form elevator lobbies in non-sprinklered buildings. Smoke barriers provide equal or better protection than fire partitions.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

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The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification for elevator lobby requirements. While technical criteria was added for horizontal continuity for fire partitions and smoke partitions at elevator lobbies, this was implied previously and does not add cost to construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 3007.6.2 Elevator lobby ~~enclosure~~ separation. The fire service access elevator lobby shall be separated from each floor with a smoke barrier in accordance with Section 709 , except that lobby doorways shall comply with Section 3007.6.3.
Exception: ~~Enclosed fire~~ Fire service access elevator lobbies are not required to be separated at the levels of exit discharge.

3008.6.2 Elevator lobby ~~enclosure~~ separation. The occupant evacuation elevator lobby shall be separated from each floor with a smoke barrier in accordance with Section 709 , except that lobby doorways shall comply with Section 3008.6.3.
Exception: ~~Enclosed occupant~~ Occupant evacuation elevator lobbies are not required to be separated at the levels of exit discharge.

Committee Reason: The modification provides better language for consistency by using 'separated' instead of 'enclosed' for lobbies. The proposal is a good clean up of the language for which walls make up the elevator lobby and provides consistency between the general lobbies, fire service access elevators lobbies and occupant evacuation elevator lobbies. (Vote: 14-0)

Final Hearing Results

G183-21 Part I	AM

G183-21 Part II

Original Proposal

PART II - IBC: 708.4.1 (New), 709.4.2, 710.4.1 (New)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

SECTION 708 FIRE PARTITIONS

Add new text as follows:

<u>708.4.1 Fire partition walls enclosing elevator lobbies</u>. <u>Fire partition walls used to enclose elevator lobbies in accordance with Section 3006.3 (elevator hoistway protection), shall form an effective enclosure that terminates at a fire barrier or fire partition having a level of fire-resistance-rating not less than 1 hour, or an outside wall.</u>

SECTION 709 SMOKE BARRIERS

Revise as follows:

709.4.2 Smoke-barrier walls enclosing areas of refuge or elevator lobbies. *Smoke-barrier* walls used to enclose *areas of refuge* in accordance with Section 1009.6.4, or to enclose elevator lobbies in accordance with Section 405.4.3, 3007.6.2, or 3008.6.2, shall form an effective membrane enclosure that terminates at a *fire barrier* wall having a ~~level of~~ *fire* ~~*protection*~~ <u>*resistance*</u> *rating* not less than 1 hour, another *smoke barrier* wall or an outside wall. A smoke and draft control door assembly as specified in Section 716.2.2.1.1 shall not be required at each elevator hoistway door ~~opening~~ <u>where protected by an elevator lobby, at each exit door opening into a protected lobby</u>or at each exit doorway between an *area of refuge* and the exit enclosure.

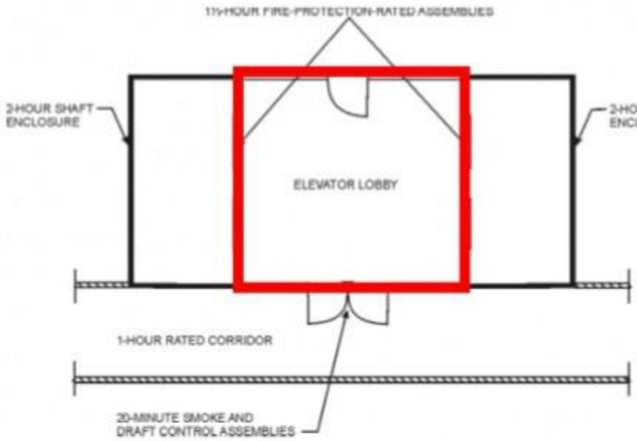
SECTION 710 SMOKE PARTITIONS

Add new text as follows:

<u>710.4.1 Smoke partition walls enclosing elevator lobbies</u>. <u>Smoke partition walls used to enclose elevator lobbies in accordance with Section 3006.3 (elevator hoistway protection), shall form an effective enclosure that terminates at a fire barrier having a level of fire-resistance-rating not less than 1 hour, another smoke partition or an outside wall.</u>

Reason: The intent of this proposal is to clarify lobby protection requirements – which walls are fire barriers, fire partitions or smoke barriers. This will also clarify what requirements are applicable for the elevator hoistway doors vs. the doors in the other walls of the lobby protection. The current language is inconsistent for the locations where elevator lobbies are specified.
This protection of elevator lobbies is a combination of the elevator hoistway and exit stairway (direct access to a stairway is required for fire service an occupant evacuation elevator lobbies) shaft enclosure/fire barriers and the fire partitions or smoke barriers required for lobbies (405.4.3, 3006.3, 3007.6.2 and 3008.6.2) The intent of new 708.4.1 and revised 709.4.2 is to clarify that the fire partitions/smoke barrier criteria is <u>not</u> applicable to all the walls of the elevator lobby since the vertical shaft/fire barrier protections is adequate. Fires typically happen in the occupied portions of the buildings, not within the elevator shaft or the stairway. In addition, in situations where an elevator

lobby is provided, the elevator shafts are double protected from smoke intrusion from a fire on the floor.



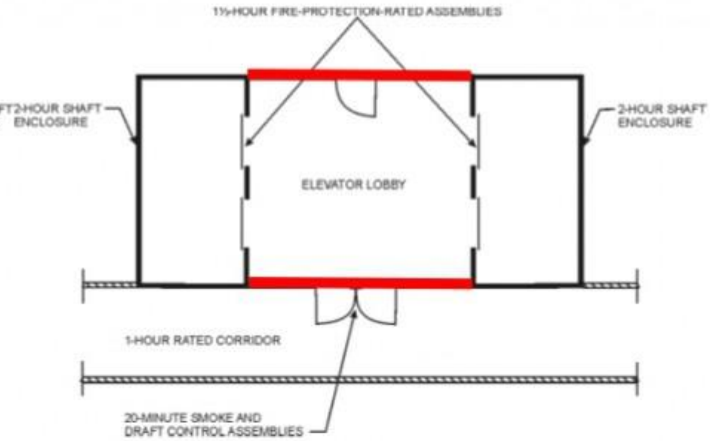


Diagram for elevator lobby Diagram for which walls are fire partitions, smoke partitions or smoke barriers

Provisions for horizontal continuity are addressed for smoke barriers that surround elevator lobbies or areas of refuge. The same horizontal continuity should be addressed for elevator lobbies enclosed with fire partitions in Section 3006.3 Item 1 or smoke partitions in Section 3006.3 Item 2. The movement of 'smoke barrier wall' just assures a minimum fire resistance rating. The last sentence in 709.4.2 is not needed with the clarification of which walls meet which requirements in Chapter 30.

The reference to sprinklers is not needed in Section 3006.3 Item 2, because this is already a limitation in Section 3006.2. Taking it out makes this item easier to read. In addition, this could currently be read to not allow smoke barriers to form elevator lobbies in non-sprinklered buildings. Smoke barriers provide equal or better protection than fire partitions.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

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Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification for elevator lobby requirements. While technical criteria was added for horizontal continuity for fire partitions and smoke partitions at elevator lobbies, this was implied previously and does not add cost to construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

708.4.1 Fire partition walls enclosing elevator lobbies. Fire partition walls used to enclose elevator lobbies in accordance with Section 3006.3 ~~(elevator hoistway protection),~~ shall form an ~~effective~~ enclosure that terminates at a fire barrier or fire partition having a level of fire-resistance-rating not less than 1 hour, or an outside wall.

710.4.1 Smoke partition walls enclosing elevator lobbies. Smoke partition walls used to enclose elevator lobbies in accordance with Section 3006.3 ~~(elevator hoistway protection),~~ shall form an ~~effective~~ enclosure that terminates at a fire barrier having a level of fire-resistance-rating not less than 1 hour, another smoke partition or an outside wall.

Committee Reason: The committee concluded the modification is a good clean-up of the text and making the proposed text comply with the rest of the code by deleting "elevator hoistway protection" and "effective" in sections 708.4.1 and 710.4.1. The proposal provides clarification for the protection of elevator lobbies and outlines the types of fire resistance where it is required. (Vote: 13-0)

Final Hearing Results

G183-21 Part II	AM

G185-21

Original Proposal

IBC: SECTION 202 (New), 3006.3

Proponents: Curtis Gonzales, Smoke Guard, Inc., Smoke Guard, Inc. (curtis.gonzales@smokeguard.com); Amanda Hickman, The Hickman Group, SmokeGuard, Inc. (amanda@thehickmangroup.com)

2021 International Building Code

Add new definition as follows:

<u>**SMOKE PROTECTIVE CURTAIN ASSEMBLY FOR HOISTWAY**</u>

.

<u>An automatic closing smoke and draft control curtain assembly</u>.

Revise as follows:

3006.3 Hoistway opening protection. Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway*shaft enclosure* doors from each floor by *fire partitions* in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for *corridor* walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway*shaft enclosure* doors from each floor by *smoke partitions* in accordance with Section 710 where the building is equipped throughout with an*automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such~~door~~ <u>doors</u> shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.
5. <u>A *smoke protective curtain assembly for hoistways* shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such curtain assemblies shall comply with the smoke and draft control requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal. Such curtain assemblies shall be equipped with a control unit listed to UL 864. Such curtain assemblies shall comply with section 2.11.6.3 of ASME A17.1/CSA B44. Installation and maintenance shall be in accordance with NFPA 105</u>

Reason: *Smoke protective curtain assemblies for hoistways* are recognized and regulated in NFPA 105 Chapter 9 (2019). There are multiple manufactures of these assemblies in the market. These products have been in the market for 25 years with tens of thousands of successful installations. Smoke protective curtain assemblies provide a proven means for smoke and draft control at the hoistway door that enables design freedom and innovation. Smoke protective curtain assemblies for hoistways should be allowed to provide smoke and draft protection where enclosed elevator lobbies are not required.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of this option for hoistway opening protection is offset by the cost of other forms of protection. As such, the cost of construction for adding option five does not raise or lower the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this modification allows for smoke protective curtain assemblies to be used at elevator doors to meet the smoke protection requirements for rated corridors. The UL 864 listing for the controller is appropriate. Some committee members felt this option was already permitted as an alternative to Section 3006.3 Item 3. (Vote: 8-7)

Final Hearing Results

G185-21	AS

G187-21

Original Proposal

IBC: 3007.6

Proponents: Stephen Thomas, Colorado Code Consulting, LLC, Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Building Code

Revise as follows:

3007.6 Fire service access elevator lobby. The fire service access elevator shall open into an enclosed fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.6.5. Egress is permitted through the enclosed elevator lobby in accordance with Item 1 of Section 1016.2.

~~Exception~~Exceptions:

1. Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to be protected in accordance with Section 3006.3.2.
2. A fire service access elevator lobby is not required to be provided at an occupied roof.

Reason: We do not believe that it is necessary to have a fire service access elevator lobby at an occupied roof. There is no purpose for having such an elevator. the purpose of the lobby is to provide a staging area for the fire department to access the floor(s) above. There are no floors above an occupied roof. Therefore, the requirements for the FSAE lobby is unnecessary at that level. This exception maintains the reasonable level of access to the occupied roof, but does not require all of the requirements for the lobby.

Cost Impact: The code change proposal will decrease the cost of construction
Eliminating the requirements for a FSAE lobby at the occupied roof level will reduce the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved because the committee agreed that a lobby for fire department staging or assisted rescue was not needed at the roof level. The additional expense is not justified and there was a concern that this lobby would be considered an additional floor for building height. As editorial, the committee requested that the new exception coordinate "occupied roof" with the "occupiable roof" approved in G21-21 Part 1. (Vote: 14-0)

Final Hearing Results

G187-21	AS

G188-21

Original Proposal

IBC: SECTION 3009 (New), 3009.1 (New), 3009.2 (New), 3009.3 (New)

Proponents: Kevin Brinkman, National Elevator Industry, Inc., National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Building Code

Add new text as follows:

SECTION 3009
PRIVATE RESIDENCE ELEVATORS

3009.1 General. The design, construction, installation, alteration, repair and maintenance of elevators installed within a residential dwelling unit or installed to provide access to one individual residential dwelling unit shall conform to ASME A17.1/CSA B44, Section 5.3.

3009.2 Hoistway Enclosures. Hoistway enclosures shall comply with ASME A17.1/CSA B44, Requirement 5.3.1.1.

3009.3 Hoistway Opening Protection. Hoistway landing doors for private residence elevators shall comply with ASME A17.1/CSA B44, Requirements 5.3.1.8.1 through 5.3.1.8.3.

Reason: Excessive clearances between the car door and the hoistway door on private residence elevators presents a serious hazard to young children and slight built adolescents or adults. Proper installation of the hoistway landing doors is critical to ensuring the gap between the hoistway door and the car door or gate does not exceed a 4 inch gap. The 4 inch maximum clearance is based on anthropometric data for young children. However, private residence elevators are not inspected by elevator inspectors in most jurisdictions and the few jurisdictions that do inspect them are mostly limited to the installation of new equipment. On the other hand, almost all private residence construction is inspected by construction officials.

The General Contractor typically constructs the hoistway enclosure and installs the hoistway doors on private residence elevators. Ensuring the installation of the hoistway doors so that the clearance between the hoistway door and the landing sill does not exceed the 0.75 inch requirement in ASME A17.1/CSA B44, will greatly increase the likelihood that the clearance between the hoistway and car doors will comply with the 4 inch gap. The proposed language increases awareness for the building designers, contractors and building code officials to the need to mitigate this serious hazard, while retaining the actual code requirements in ASME A17.1/CSA B44.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no additional cost because these requirements are already contained in the A17.1/B44 code referenced in Section 3001.3. This is being added to alert builders to these requirements.

Public Hearing Results

Committee Action	**As Modified**

Committee Modification: 3009.1 General. The design, construction, and installation~~, alteration, repair and maintenance~~ of elevators installed within a residential dwelling unit or installed to provide access to one individual residential dwelling unit shall conform to ASME A17.1/CSA B44, Section 5.3.

Committee Reason: The modification was because the alteration, maintenance and repair of a private residence elevators is regulated by the property maintenance code. The proposal was approved as the text will address a safety issue for private residence elevator installations. This provides direction for inspectors. (Vote: 10-4)

Final Hearing Results

G188-21	AM

G189-21

Original Proposal

IBC: 3103.1, 3103.5 (New)

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

3103.1 General. The provisions of Sections 3103.1 through ~~3103.4~~ <u>3103.5</u> shall apply to structures erected for a period of less than 180 days. *Special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code*. Those erected for a longer period of time shall comply with applicable sections of this code.

Add new text as follows:

<u>**3103.5 Bleachers.** Temporary bleachers, grandstands and folding and telescopic seating, that are not building elements, shall comply with ICC 300.</u>

Reason: The ICC 300 includes provisions for relocated and temporary bleachers. This information should be included in the IBC Chapter 31 requirements, so it does not get missed for seasonal venues or items such as seating for parades. The definition of 'temporary special event structures' in the IFC says that applies to items not addressed in IBC, so a similar reference in IFC is not needed.
This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is already a reference for ICC 300 in IBC Chapter 10, therefore, this is not a change in requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as the committee felt that the ICC 300 was the correct reference for the temporary bleachers, grandstands and folding and telescopic seating. As editorial, the Committee requested that the title of the section be revised to include all three elements. (Vote: 14-0)

Final Hearing Results

G189-21	AS

G191-21

Original Proposal

IBC: 3105.2

Proponents: Marcelo Hirschler, GBH International, self (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

3105.2 Design and construction. *Awnings* and *canopies* shall be designed and constructed to withstand wind or other lateral*loads* and *live loads* as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. *Awnings* shall have frames of noncombustible material, *fire-retardant-treated wood*, <u>or</u> heavy timber complying with Section 2304.11~~, or 1-hour construction with combustible or noncombustible covers~~ and shall be either fixed, retractable, folding or collapsible.

Reason: The statement that the awnings or canopies shall be constructed with "combustible or noncombustible materials" is meaningless since there is no other option for a material: it is either combustible or it is noncombustible. The requirement for the frame of an awning to comply with a fire resistance rating (which is what 1-hour construction means) is not an adequate requirement for two reasons. Firstly, fire resistance ratings are intended to assess (as the IBC definition states): "The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703." Secondly, fire resistance ratings are applied to "assemblies of masonry units" and similar assemblies but not to individual materials which are not separating one compartment from another one.
The section contains all the appropriate requirements in terms of structural performance, including the fact that wind and other loads must be able to be withstood.

The awnings being regulated are not separating compartments and, therefore, requiring a fire resistance rating is not appropriate.

Pictures of awnings illustrate the issue:




For information, the first section of the scope of the test used to assess fire resistance ratings (ASTM E119) reads as follows:

1.1 The test methods described in this fire-test-response standard are applicable to assemblies of masonry units and to composite assemblies of structural materials for buildings, including loadbearing and other walls and partitions, columns, girders, beams, slabs, and composite slab and beam assemblies for floors and roofs. They are also applicable to other assemblies and structural units that constitute permanent integral parts of a finished building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No additional requirements are being added.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted based on the provided reason statement. The committee did express concerns that additional justification would be beneficial. (Vote: 8-7)

Public Comments

Public Comment 1

Proponents: Jonathan Siu, Self, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3105.2 Design and construction . *Awnings* and *canopies* shall be designed and constructed to withstand wind or other lateral *loads* and *live loads* as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. *Awnings* shall have frames of noncombustible material, *fire-retardant-treated wood*, ~~or~~ heavy timber complying with Section 2304.11, or 1-hour construction, and shall be either fixed, retractable, folding or collapsible.

Commenter's Reason: This public comment restores the option of 1-hour construction for awning frames, which was removed in the original proposal. It will leave intact the deletion of the text referring to combustible or non-combustible covers (is there any other kind?) The reason statement for FS29 says that the fire rating is "inappropriate" because awnings don't serve to separate compartments. We don't understand this rationale for eliminating the option of providing rated construction. Framing in other structures such as steel moment frames (beams and columns) do not serve to separate compartments, yet the elements are required to have a fire-resistance rating in Table 601.

More importantly, under the current code, the 1-hour construction is just one of several options that a designer can utilize--the designer can choose framing that is non-combustible, fire-retardant treated wood, or heavy timber. 1-hour construction is easily equivalent (or better, in some cases) than the other three listed methods, so there is no technical reason why it should not be an option.

While there is some technical merit in deleting the combustible/noncombustible language, if the membership does not want to make a change for such a minor editorial issue (which is the ultimate result if this proposal is approved as modified by this public comment), we would recommend voting for Disapproval for the whole code change proposal.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Although it could be argued that by eliminating an option the original code change might increase the cost of construction in some cases, restoring that option via this public comment will result in no technical change to the code provisions from the previous code edition, and therefore, no increase or decrease in the cost of construction.

Final Hearing Results

G191-21 AMPC1

G193-21

Original Proposal

IBC: SECTION 202 (New), 3111.3.5, 3111.3.5.1, 3111.3.5.2 (New)

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, Interstate Renewable Energy Council (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept., California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, CA Solar & Storage Association, CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, Solar Energy Industries Association (SEIA), SEIA (JoeCainPE@gmail.com)

2021 International Building Code

Add new definition as follows:

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED.

.
An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED.

.
An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

Add new text as follows:

3111.3.5 Elevated photovoltaic (PV) support structures. *Elevated PV support structures* shall comply with either 3111.3.5.1 or 3111.3.5.2.

Exception: *Elevated PV support structures* that are installed over agricultural use.

3111.3.5.1 PV panels installed over open-grid framing or non-combustible deck. *Elevated PV support structures* with PV panels installed over open-grid framing or over a noncombustible deck shall have PV panels tested, *listed*, and *labeled* with a fire type rating in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Photovoltaic panels marked "not fire rated" shall not be installed on *elevated PV support structures*.

3111.3.5.2 PV panels installed over a roof assembly. *Elevated PV support structures* with a PV panel system installed over a roof assembly shall have a fire classification in accordance with Section 1505.9.

Revise as follows:

~~3111.3.5~~ 3111.3.6 Ground-mounted photovoltaic (PV) panel systems. Ground-mounted photovoltaic panel systems shall be designed and installed in accordance with Chapter 16 and the *International Fire Code*.

~~3111.3.5.1~~ 3111.3.6.1 Fire separation distances. Ground-mounted photovoltaic panel systems shall be subject to the *fire separation distance* requirements determined by the local jurisdiction.

Reason: The primary purpose of this proposal is to establish appropriate fire testing and listing criteria for overhead photovoltaic (PV) support structures that could have people or vehicles in the space beneath them. Sometimes referred to as "solar shade structures," they are most commonly constructed over vehicle parking spaces of surface parking lots, are sometimes built on the uppermost level of parking garages, but could be built in a variety of locations with or without cars parked beneath.

Overhead PV structures are referenced in 2021 IBC Section 1607.14.4, and in 2019 California Building Code Section 503.1, but without any definitions.

In 2021 IBC Section 1607.14.4.3, these structures are described as "Structures with open grid framing and without a roof deck or sheathing supporting photovoltaic panel systems."

In 2019 California Building Code Section 503.1, Exception 2, these structures are described as: "… solar photovoltaic panels supported by a structure with no use underneath…" In Exception 3, there is a more-specific description by location: "… solar photovoltaic panels supported by a structure over parking stalls …"

Ground-mounted photovoltaic panel systems are referenced in the 2021 I-codes, in IBC Sections 1607.4.4 and 3111.3.5; in IRC Section R324.7; and in IFC Section 1205.5.

For the proposed definition of Elevated PV Support Structure note the minimum height threshold of 7'-6" is consistent with IBC 1003.2.

Most PV panels in the marketplace have been fire tested and assigned a "type rating" in accordance with UL 1703. However, some PV panels might not have that fire testing, and could be marked "not fire rated." This proposal clarifies that PV panels marked "not fire rated" cannot be used on elevated/overhead PV structures that could have people or cars beneath them, with or without a full roof assembly.

Where elevated PV structures have PV panels mounted over open-grid framing with no roof deck or sheathing cannot achieve a "fire classification" because there is no combustible roof covering to ignite in a UL 2703 spread-of-flame or burning brand test. Therefore, it is sufficient protection to install only type-rated modules. The same is true when PV panels are installed directly over noncombustible metal sheathing without a stand-off mounting system.

Where elevated PV structures have a roof assembly and PV panels are rooftop mounted over that roof assembly, then those structures must have a fire classification according to Section 1505.9.There are several different stakeholder groups that will benefit from this proposal.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It encourages the use of solar without adversely impacting safety.

Staff Note: G192-21 and G193-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted per the provided reason statement. The proposal represents an extension coordinate effort of those involved. (Vote: 13-1)

Final Hearing Results

G193-21 AS

G194-21

Original Proposal

IBC: 3101.1, SECTION 3114, 3114.1, 3114.2

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Building Code

Revise as follows:

3101.1 Scope. The provisions of this chapter shall govern special building construction including *membrane structures*, temporary structures, *pedestrian walkways* and tunnels, automatic *vehicular gates*, *awnings* and *canopies*, *marquees*, signs, towers, antennas, relocatable buildings, swimming pool enclosures and safety devices, solar energy systems~~, public use restroom buildings on publicly owned lands in *flood hazard areas*~~ and *intermodal shipping containers*.

Delete without substitution:

~~SECTION 3114~~
~~PUBLIC USE RESTROOM BUILDINGS IN FLOOD HAZARD AREAS~~

~~**3114.1 General.** For the purpose of this section, public restroom buildings are located on publicly owned lands in *flood hazard areas* and intended for public use. Public restroom buildings and portions of other buildings that contain public restrooms are limited to toilet rooms, bathrooms, showers and changing rooms. Public restroom buildings and portions of buildings that contain public restrooms shall comply with the requirements of this section. Public-use restrooms that are not elevated or *dry floodproofed* in accordance with Section 1612 shall comply with Section 3114.2. Portions of buildings that include uses other than public-use toilet rooms, bathrooms, showers and changing rooms shall comply with Section 1612.~~

~~**3114.2 Flood resistance.** Public-use restrooms on publicly owned lands in *flood hazard areas* shall comply with the requirements of ASCE 24, except for elevation requirements, and shall comply with all of the following criteria:~~

1. ~~The building footprint is not more than 1,500 square feet (139 m^2).~~
2. ~~Located, designed and constructed to resist the effects of *flood* hazards and *flood loads* to minimize *flood* damage from a combination of wind and water *loads* associated with the *base flood*.~~
3. ~~Anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic *loads*, including the effects of buoyancy during conditions of the *base flood*.~~
4. ~~Constructed of *flood-damage-resistant materials*.~~
5. ~~Where enclosed by walls, the walls have flood openings.~~
6. ~~Mechanical and electrical systems are located above the *base flood elevation*.~~
7. ~~Plumbing fixtures and plumbing connections are located above the *base flood elevation*.~~
8. ~~An emergency plan, approved by the jurisdiction, is submitted to the building official and includes building design documents specifying implementation of protection measures prior to the onset of *flooding* conditions.~~

~~**Exceptions:**~~

1. ~~Minimum necessary electric equipment required to address health, life safety and electric code requirements is permitted below the *base flood elevation* in accordance with ASCE 24 provisions for electric elements installed below the minimum elevations.~~

2. ~~Plumbing fixtures and connections are permitted below the *base flood elevation* provided that the fixtures and connections are designed and installed to minimize or eliminate infiltration of floodwaters into the sanitary sewage system and discharges from sanitary sewage systems into floodwaters.~~

Reason: Section 3114 was added to the 2021 IBC by code change proposal G149-18. The proponents were Florida Division of Emergency Management and Building Officials Association of Florida. The Florida Building Commission rejected a proposal by the FDEM to include Section 3114 in the process of developing the 7th edition of the Florida Building Code (FBC). Section 553.73 of the Florida Statutes specifies that, at a minimum, the Commission must "adopt any updates to such codes or any other code necessary to maintain eligibility for federal funding and discounts from the National Flood Insurance Program, the Federal Emergency Management Agency, and the United States Department of Housing and Urban Development." As part of the deliberation of code change proposal G149-18, FEMA submitted a statement explaining the proposal is not consistent with the NFIP and could increase public disaster recovery costs by allowing at-risk public facilities. Because Section 3114 does not meet requirements necessary to maintain NFIP eligibility, the section will not be included in the 7th Edition FBC.
Public use restrooms in flood hazard areas in communities that participate in the NFIP must either meet the elevation requirements of ASCE 24 for Flood Design Class 2 or be dry floodproofed to that same elevation, which is the base flood elevation plus 1 foot. Many coastal communities successfully elevate restrooms in beachfront parks, and many communities elevate or dry floodproof restrooms in public lands along rivers and streams. Of the more than 22,700 communities identified by FEMA as having some degree of flood risk, more than 21,000 elect to participate in the NFIP (as of mid-2019).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal may add to construction costs for some restrooms that might have been designed in accordance with Sec. 3114 depending on height of elevation above the ground, construction of ramps, and/or installation of elevators for ADA compliance. However, this proposal does not change the cost of new public use restrooms in communities that already require them to be elevated or dry floodproofed in accordance with the minimum requirements of the NFIP.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal submitted by FEMA was approved as submitted as per the reason statement. The proposal resolves an existing discontinuity. (Vote: 14-0)

Final Hearing Results

G194-21 AS

G196-21

Original Proposal

IBC: 3115.3, 3115.3.2 (New), FIGURE 3115.3.2 (New), 3115.8, 3115.8.1, 3115.8.1.1, 3115.8.2, 3115.8.3, 3115.8.3.4 (New), FIGURE 3115.8.3.4 (New), 3115.8.3.4.1 (New), 3115.8.3.4.2 (New), 3115.8.4.1, 3115.8.4.2, 3115.8.4.3, 3115.8.3.4.1 (New), 3115.8.3.4.2, 3115.8.5, 3115.8.5.1, 3115.8.5.2, 3115.8.5.3, TABLE 3115.8.5.3, ISO Chapter 35

Proponents: John-Jozef Proczka, City of Phoenix, self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Add new text as follows:

3115.3 Intermodal shipping container physical identification. *Intermodal shipping containers* shall have the physical markings and data plate required by Sections 3115.3.1 and 3115.3.2 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner and building official.
Where approved by the building official, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

Revise as follows:

~~3115.3~~ 3115.3.1 Intermodal shipping container ~~information~~ data plate. *Intermodal shipping containers* shall bear an existing plate labelled as "CSC SAFETY APPROVAL" in English or French containing the following information. ~~as required by ISO 6346 CSC and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.~~

1. ~~Manufacturer's name or identification number.~~ Abbreviated country of approval, abbreviated approval agency, and approval agency reference number.
2. Date manufactured.
3. ~~Safety approval number.~~
4. ~~3.~~ Manufacturer's Identification number.
5. ~~4.~~ Maximum operating gross mass ~~or weight~~ (kg) (lbs).
6. ~~5.~~ Allowable stacking load for 1.8G (kg) (lbs).
7. ~~6.~~ Transverse racking test force (Newtons).
8. ~~7.~~ ~~Valid~~ Required maintenance examination date.

~~Where approved by the *building official*, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.~~

Add new text as follows:

3115.3.2 Intermodal shipping container markings. *Intermodal shipping containers* shall have markings, separate from the data plate, containing the following information. Refer to Figure 3115.3.2 for an example layout of the markings.

1. An owner code consisting of three letters.
2. An equipment category identifier that shall be the letter U. This equipment category identifier is grouped with and immediately follows the owner code.
3. A six digit serial number.

4. A check digit in a box.

5. A two digit size code.

6. A type code of two letters. The first letter shall be G, V, U, B, or S. This type code is grouped with and immediately follows the size code.

7. Maximum gross mass (kgs) (lbs).

8. Tare mass (kgs) (lbs).

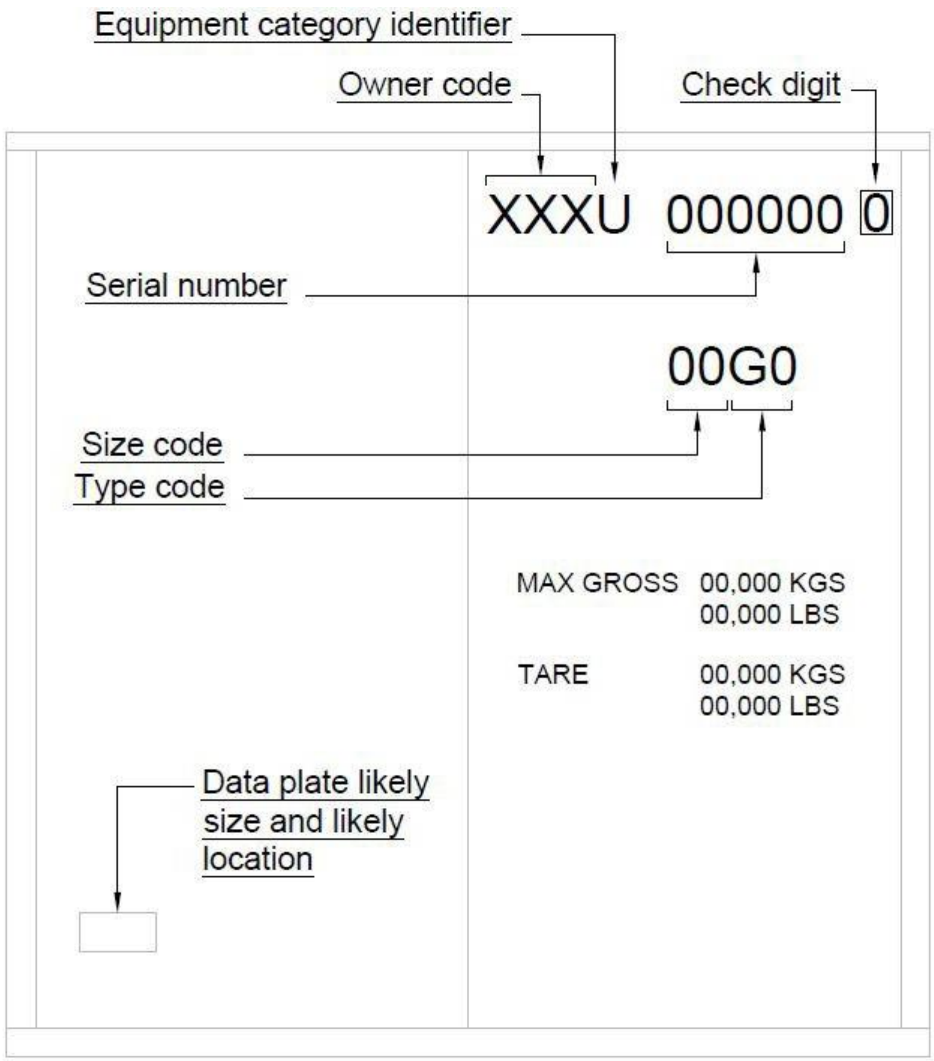

FIGURE 3115.3.2 MARKING IDENTIFICATION AND LIKELY LAYOUT

3115.4 Protection against decay and termites. Wood structural floors of *intermodal shipping containers* shall be protected from decay and termites in accordance with the applicable provisions of Section 2304.12.1.1.

3115.5 Under-floor ventilation. The space between the bottom of the floor joists and the earth under any *intermodal shipping container*, except spaces occupied by basements and cellars, shall be provided with ventilation in accordance with Section 1202.4.

3115.6 Roof assemblies. *Intermodal shipping container* roof assemblies shall comply with the applicable requirements of Chapter 15.

Exception: Single-unit, stand-alone intermodal shipping containers not attached to, or stacked vertically over, other intermodal shipping containers, buildings or structures.

3115.7 Joints and voids. Joints and voids that create concealed spaces between connected or stacked *intermodal shipping containers* at fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved *fire-resistant joint system* in accordance with Section 715.

Revise as follows:

3115.8 Structural. Intermodal shipping containers that conform to international standards that test certain structural properties of the containers ~~ISO 1496-1~~, as identified by the required markings in Section 3115.3.2, and are repurposed for use as buildings or structures, or as a part of buildings or structures, shall be designed in accordance with Chapter 16, and the material specific chapters, ~~and~~ except for the provisions specifically stated in Section 3115.8.1 through 3115.8.4.3 ~~this section~~.

3115.8.1 Foundations and stacking. *Intermodal shipping containers* repurposed for use as a permanent building or structure shall be supported on foundations, other *intermodal shipping containers*, or other supporting structures designed and constructed in accordance with Chapters 16 through 23.

3115.8.1.1 Anchorage. *Intermodal shipping containers* shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental *loads* in accordance with Chapter 16.

Delete without substitution:

~~**3115.8.2 Welds.** New welds and connections shall be equal to or greater than the original connections~~.

Revise as follows:

~~**3115.8.3**~~ **3115.8.2 Structural design.** The structural design for the *intermodal shipping containers* repurposed for use as a building or structure, or as part of a building or structure, shall comply with Section ~~3115.8.4~~ 3115.8.3 or ~~3115.8.5~~ 3115.8.4.

~~**3115.8.4**~~ **3115.8.3 Detailed design procedure.** A structural analysis meeting the requirements of Chapter 16, the applicable material chapters, and Section 3115.8.3.1 through 3115.8.3.4.2 ~~this section~~ shall be provided to the *building official* to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Intermodal shipping containers designed in accordance with Section 3115.8.4 ~~3115.8.5.~~

~~**3115.8.4.1**~~ **3115.8.3.1 Steel Material properties.**
Structural material properties for existing *intermodal shipping container* steel components shall be established by Section 2202. ~~material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test.~~

~~**3115.8.4.2**~~ **3115.8.3.2 Seismic design parameters.** The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the ~~corrugated~~ profiled steel panel container sides are considered to be the vertical seismic force-resisting system, design and detailing shall be in accordance with AISI S100 ~~the~~ and ASCE 7, Table 12.2-1 requirements for ~~light-frame bearing-wall systems with shear panels of all other materials.~~ steel systems not specifically detailed for for seismic resistance, excluding cantilever column systems.
2. Where portions of the ~~corrugated~~ profiled steel panel container sides are retained, but are not considered to be the vertical seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where portions of the ~~corrugated~~ profiled steel panel container sides are retained and integrated into a vertical seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

~~**3115.8.4.3**~~ **3115.8.3.3 Allowable shear value.** The allowable shear values for the *intermodal shipping container* ~~corrugated~~ profiled steel ~~sheet~~ panel side walls and end walls shall be demonstrated by testing and analysis accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

Exceptions: The allowable shear values shall be obtained from Section 3115.8.4.3 where the seismic design category is A, and the following two items are met:

1. The *intermodal shipping container* top and bottom rails, corner fittings, and columns or any portion thereof are not notched, cut, or removed in any manner.
2. The *intermodal shipping container* is erected in a level and horizontal position with the floor located at the bottom.

Add new text as follows:

3115.8.3.4 Tested structural components. Where they are not altered, the structural components identified in Section 3115.8.3.4.1 and 3115.8.3.4.2 can be used with the load combinations of Section 1605.3 based on the testing performed during the *intermodal shipping container* certification process. This certification shall have been verified by the data plate and markings in Section 3115.3.
The components names are labeled in Figure 3115.8.3.4.

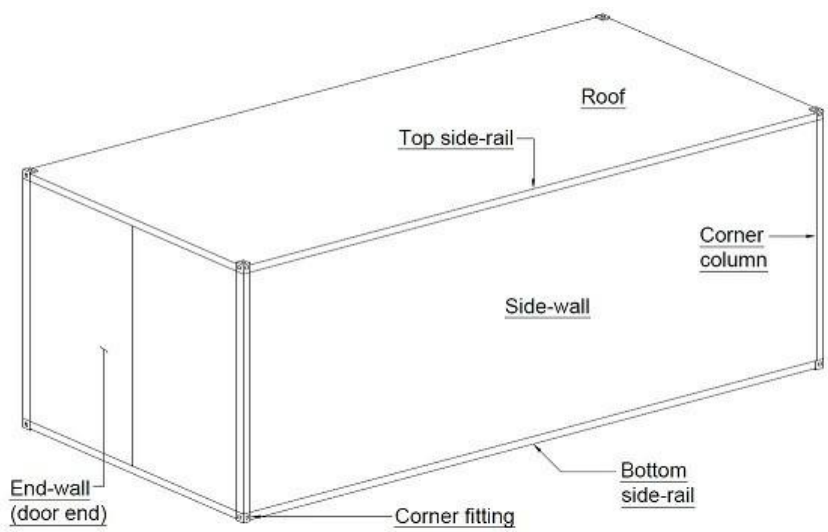

FIGURE 3115.8.3.4 CONTAINER ELEMENT IDENTIFICATION

3115.8.3.4.1 Floors. Where the floor is not structurally altered from its state as a shipping container, the allowable superimposed out-of-plane design load for the floor is permitted to be calculated in accordance with Equation 31-1. The design load of the bottom rails to span from corner to corner shall not be obtained using similar methods. The ability for the floors and bottom rails to sustain these out-of-plane loads in combination with other forces shall be determined by the structural analysis.

Exceptions:

1. The capacity of the shipping container bottom side rails, in their original vertical orientation, to span from corner to corner under gravity loads can be obtained from Equation 31-2, where the floor, walls directly above, top rail directly above, corner columns, and roof are not structurally altered from their state as a shipping container.
2. The capacity of the shipping container bottom end rails, in their original vertical orientation, to span from corner to corner under gravity loads can be obtained from Equation 31-3, where the floor, walls directly above, top rail directly above, corner columns, and roof are not structurally altered from their state as a shipping container.

$q_a = 0.8(R-T)/(LW)$ **(Equation 31-1)**

where:

q_a = Allowable superimposed design load using ASD load combinations, in lb/f^{2}t (kg/m^2)

R = Maximum gross mass, as marked on the container and its CSC Safety Approval Plate, in lbs (kgs)

T = Tare mass, as marked on the container and its CSC Safety Approval Plate, in lbs (kgs)

L = Interior floor length dimension of the shipping container, in feet (meters)

W = interior floor width dimension of the shipping container, in feet (meters)

$w_a = 0.8(R-T)/W$ **(Equation 31-2)**

where:

w_a = Allowable superimposed design load using ASD load combinations, in lb/ft (kg/m)

The other variables are defined as in Equation 31-1.

$w_a = 0.8(R-T)/L$ **(Equation 31-3)**

where:

The variables are defined as in Equation 31-1 and 31-2.

3115.8.3.4.2 Side-wall and end-wall. Where the side-wall is not structurally altered from its state as a shipping container, the allowable out-of-plane design load for the side-wall is permitted to be calculated in accordance with Equation 31-4. The ability for the side-wall to sustain these out-of-plane loads in combination with other forces shall be determined by the structural analysis.

Where the end-wall is not structurally altered from its state as a shipping container, the allowable out-of-plane design load for the end-wall is permitted to be calculated in accordance with Equation 31-5. The ability for the end-wall to sustain these out-of-plane loads in combination with other forces shall be determined by the structural analysis.

$q_a=0.24(R-T)/HL$ **(Equation 31-4)**

where:

H = The interior height dimension of the wall, in feet (meters)

The other variables are defined as in equation 31-1.

$q_a = 0.16(R-T)/HW$ **(Equation 31-5)**

where:

The variables are defined as in Equation 31-1 and 31-4.

Revise as follows:

3115.8.4 ~~**3115.8.5**~~ **Simplified structural design of single-unit containers.** Single-unit *intermodal shipping containers* conforming to the limitations of Section 3115.8.5.1 shall be permitted to be designed in accordance with the simplified structural design provisions of Section 3115.8.5.2.

3115.8.4.1 ~~**3115.8.5.1**~~ **Limitations.** The use of Section 3115.8.5 is subject to the following limitations:

1. The *intermodal shipping container* shall be a single-unit, stand-alone unit supported on a foundation and shall not be in contact with or supporting any other shipping container or other structure.

2. The *intermodal shipping container* top and bottom rails, corner castings, and columns or any portion thereof shall not be notched, cut, or removed in any manner.
3. The *intermodal shipping container* shall be erected in a level and horizontal position with the floor located at the bottom.
4. The *intermodal shipping container* shall be located in Seismic Design Category A, B, C or D.

~~3115.8.5.2~~ 3115.8.4.2 Simplified structural design. Where permitted by Section ~~3115.8.5.1~~ 3115.8.4.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the ~~corrugated~~ profiled steel panel shear walls:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R = 2.
3. Overstrength factor, Ω_0 = 2.5.
4. Deflection amplification factor, C_d = 2.
5. Limits on structural height, h_n = 9.5 feet (2900 mm).

~~3115.8.5.3~~ 3115.8.4.3 Allowable shear. The allowable shear for the ~~corrugated~~ profiled steel panel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section ~~3115.8.5.2~~ 3115.8.4.2 shall be in accordance with Table ~~3115.8.5.3~~ 3115.8.4.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure ~~3115.8.5.3(1)~~ 3115.8.4.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure ~~3115.8.5.3(2)~~ 3115.8.4.3(2) .
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure ~~3115.8.5.3(3)~~ 3115.8.4.3(3).
4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:
   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.
   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure ~~3115.8.5.3(4)~~ 3115.8.4.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE ~~3115.8.5.3~~ 3115.8.4.3 ALLOWABLE SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER ~~CORRUGATED~~ PROFILED STEEL PANEL WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[~~b~~]	CONTAINER DIMENSION (nominal length)	CONTAINER DIMENSION (nominal height)	ALLOWABLE SHEAR VALUES (PLF)[a~~, c~~]	
			Side Wall	End Wall
1EEE	45 feet	9.5 feet	75	843
1EE		8.5 feet		
1AAA	40 feet	9.5 feet	84	
1AA		8.5 feet		
1A		8.0 feet		

1AX		< 8.0 feet		
1BBB	30 feet	9.5 feet	112	
1BB		8.5 feet		
1B		8.0 feet		
1BX		< 8.0 feet		
1CC	20 feet	8.5 feet	168	
1C		8.0 feet		
1CX		< 8.0 feet		
1D	10 feet	8.0 feet	337	
1DX		< 8.0 feet		

For SI: 1 foot = 304.8 mm.

~~a. The allowable strength shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.~~

~~b. Container designation type is derived from ISO 668~~.

~~c.~~ a. Limitations of Section 3115.8.4.1 ~~3115.8.5.1~~ shall apply.

Delete without substitution:

ISO

International Organization for Standardization
Chemin de Blandonnet 8 CP 401 1214 Vernier
Geneva, Switzerland

~~**ISO 668—2013**~~	~~Series 1 Freight Containers–Classifications, Dimensions and Ratings~~
~~ISO 1496-1–2013~~	~~Series 1 Freight Containers–Specification and Testing - Part 1: General Cargo Containers for General Purposes~~
~~ISO 6346–1995~~	~~Freight Containers–Code, Identification and Marking with Amendment 3 - 2012~~

Reason: Intermodal international shipping containers are primarily governed by two standards that would affect portions of how they behave structurally: The International Maritime Organization's (IMO) International Convention for Safe Containers (CSC) of 1972, amended in 1993, and ISO 1496-1. ISO 6346 contains the marking requirements for containers that meet various ISO standards, including 1496-1. Re 3115.3: Both CSC and ISO 6346 require different physical identifiable information to be present on the container. The CSC requires the data plate, and ISO 6346 requires much larger markings, that are usually painted on. Both need to be present in order to verify both CSC and 1496-1 have been met.

Re 3115.3.1: This section is adjusted to remove the reference to ISO 6346 for the data plate, which was both incorrect and unnecessary, as the user of the code does not need to actually read CSC or ISO 6346 to verify the items written.

Re 3115.3.2: This section is added such that the requirements that ISO 6346 requires be marked on the containers are verified, and have the correct type code, such that conformance to ISO 1496-1 can be determined by these markings.

Re 3115.8: The reference to ISO 1496-1 is removed, as the user of the code does not need to read ISO 1496-1, as it does not contain information that is used for design in this code. The user is informed that the markings that were required in 3115.3.2 verify that international standards have been met. The inclusion of the material specific chapters, is that many of the components of shipping containers cannot be structurally verified purely by the tests that have been conducted as part of the international certification process, so they would need to be analyzed in accordance with the steel and wood chapters. The final statement is in recognition that Section 3115 is modifying the provisions found elsewhere in the code that, unless specifically stated, would still apply.

Re 3115.8.1: Clarifying that containers can be stacked

Re 3115.8.2: The statement on welds could have multiple interpretations, and doesn't seem to add any value with any of them. It would require welds to be held to some vague and arbitrary standard of equality to existing welds. If this section was intended for weld replacements, or weld fixes, it should be modified as such, but its purpose would still seem dubious. It could also be interpreted that every weld taking place on a container would need to meet this vague equality requirement, which once again doesn't seem to have a purpose.

Re 3115.8.4: The inclusion of the material specific chapters, is that many of the components of shipping containers cannot be structurally verified purely by the tests that have been conducted as part of the international certification process, so they would need to be analyzed in accordance with the steel and wood chapters.

Re 3115.8.4.1: The requirements of Section 2202 already have provisions for identifying unknown steel, and so they should not be recreated or differently stated.

Re 3115.8.4.2: The sides of containers do not meet the definition for*light-frame construction* as used in the IBC or in the AISI standards, so they should not be using light-frame construction methods.They are cold-formed steel profiled panels, as such AISI S100, which invokes AISI S310 for profiled steel panels being used as diaphragms is therefore the correct reference. All of their components are steel, as required by the definition of intermodal shipping containers, so its clearly follows that they are steel systems which have not been detailed for seismic resistance. This would be in line with AISI S310 design methods as invoked by AISI S100.

Re 3115.8.4.3: A name change to be consistent with the AISI standards governing profiled steel deck diaphragm panels, AISI S100 and AISI S310. The exception proposed follows the logic used to justify the floor tested components, as the static racking strength in the longitudinal and transverse directions has been verified by tests in accordance with ISO 1496-1.

Re 3115.8.4.4: As the containers have already undergone certification that involves structural testing they can be trusted for their structural capacity in certain specific ways. The challenge comes with cutting parts out of them, or leaving their doors open, as is done when converting them into buildings. Therefore, the components that can be trusted must only be done so under certain circumstances, as laid out in this section. With some clever deductive reasoning the provisions of this section could potentially be expanded.

Re 3115.8.4.4.1: One of the easiest components of the certified containers to trust based on their testing are the floor members that typically span from side-wall to side-wall. These floors have had two primary tests conducted on them as required by both CSC and ISO 1496-1: Being loaded such that the total mass of the container and its contents reaches two times the maximum gross mass marked on the containers, and having a 16 kip 2 wheeled vehicle driven around inside of them all while only supported from their corner fittings, that project further down than their side rails. As such, equation 31-1 recognizes the tested capacity of the floors, with factors of safety. The value that the floor is required to hold during its tests is 2(R-T). As such the allowance for 0.8(R-T) is using a factor of safety of 2.5, as used for tested components in 1709.3.1. The international standard for serviceability that these containers meet is: no permanent deformation that would render them incapable of being used for their designed purpose, as such factor of safety of 2.5 should suffice for maintaining serviceability under live loading scenarios, even though the containers have never had proper serviceability limit states in accordance with the IBC. The allowance for the bottom side rails to span is similar to the floor members themselves, however the bottom side rails are braced against buckling by the adjacent floors and walls above, so the adjacent members become critical components. The bottom side rails are also aided to a very large extent in their spanning capabilities by acting as deep beams with the walls and top rail above. Therefore, their capacity can only be relied on in the cases where all of their bracing and composite action bestowing components have remained in place.

Re 3115.8.4.4.2: Similar to the floors, the walls of the containers have been tested under the international standards that the containers are certified to. The side walls are tested under a load equal to 0.6 times the mass of the net contents multiplied by the acceleration due to gravity. This is further reduced here by a factor of safety of 2.5.
The end walls are tested under a load equal to 0.4 times the mass of the net contents multiplied by the acceleration due to gravity. This is further reduced here by a factor of safety of 2.5.

Re 3115.8.5.2 and 3115.8.5.3: Simply a name change to be consistent with the AISI standards governing profiled steel deck diaphragm panels, AISI S100 and AISI S310.

Re Table 3115.8.5.3: Containers that are 10 feet long, with designations of 1D or 1DX have not been tested to transverse or longitudinal racking force resistance, in accordance with ISO 1496-1, so they cannot be trusted to have this strength, and are removed from the table. The container designation and container height provide no useful information, and are also removed.

Re ISO Standard 668, 1496-1, and 6346: The code does not require the user to go to these reference standards in order to design a building or structure, as such their inclusion as referenced standards is inconsistent with how the other reference standards are used, where they provide design information to be used in conjunction with the IBC.

Bibliography: CSC (1996), *International Convention for Safe Containers,* CSC, International Maritime Organization, 4 Albert Embanklment, London SE1 7SR, United Kingdom of Great Britain and Northern Ireland.
ISO (2013), *Series 1 freight containers - Specification and testing - Part 1: General cargo containers for general purposes,*ISO 1496-1, International Organization for Standardization, Chemin de Blandonnet 8, CP 401-1214 Vernier, Geneva, Switzerland

ISO (1995), *Freight containers - Coding, identification and marking,*ISO 6346, International Organization for Standardization, Chemin de Blandonnet 8, CP 401-1214 Vernier, Geneva, Switzerland

AISI (2020), *North American Specification for the Design of Cold-Formed Steel Structural Members,*AISI S100-16 w/S2-20, American Iron and Steel Institute, 25 Massachusettes Avenue, NW, Suite 800, Washington, DC 20001

AISI (2020), *North American Specification for the Design of Profiled Steel Diaphragm Panels,*AISI S310-20, American Iron and Steel Institute, 25 Massachusettes Avenue, NW, Suite 800, Washington, DC 20001

Cost Impact: The code change proposal will decrease the cost of construction
By recognizing some of the tests that containers have already been certified to under international standards, some of the structural components do not need to be verified by material testing or structural investigation.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved as the proposal has inconsistencies. The committee encouraged the proponent to review with and propose future updates. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: John-Jozef Proczka, City of Phoenix, self (john-jozef.proczka@phoenix.gov); Truong Huynh, City of Long Beach, ICC Los Angeles Basin Chapter (truong.huynh@longbeach.gov); Jon-Paul Cardin, American Iron and Steel Institute, American Iron and Steel Institute (jcardin@steel.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

3115.8.1 Foundations <u>and supports</u> . *Intermodal shipping containers* repurposed for use as a permanent building or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23.

3115.8.1.1 Anchorage . *Intermodal shipping containers* shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental *loads* in accordance with Chapter 16.

<u>**3115.8.1.2 Stacking .** *Intermodal shipping containers* used to support stacked units shall comply with Section 3115.8.4</u>.

Commenter's Reason: The original intent was not to prohibit stacking. Stacking of intermodal shipping containers was never clearly addressed in the 2021 IBC. This proposal clarifies that stacking is allowed and which section is required for the design of stacked containers.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction

Simply clarification that stacking is allowed under the detailed structural design procedure

Final Hearing Results

G196-21	AMPC1

G197-21

Original Proposal

IBC: 3115.8.4, 3115.8.4.2, 3115.8.4.3, 3115.8.5, 3115.8.5.2, 3115.8.5.3, TABLE 3115.8.5.3

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

SECTION 3115 INTERMODAL SHIPPING CONTAINERS

3115.8.4 Detailed <u>structural</u> design procedure. A structural analysis meeting the requirements of this section shall be provided to the *building official* to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Intermodal shipping containers designed in accordance with Section 3115.8.5.

3115.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the ~~corrugated steel~~ <u>intermodal shipping</u> container ~~sides~~<u>elements</u> are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7, Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials.
2. Where portions of the ~~corrugated steel~~ <u>intermodal shipping</u> container ~~sides~~ <u>elements</u> are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where portions of the ~~corrugated steel~~ <u>intermodal shipping</u> container ~~sides~~ <u>elements</u> are retained and integrated into a seismic force-resisting system other than as permitted by <u>Section 3115.8.4.2</u> Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.4.3 Allowable shear value. The allowable shear values for the *intermodal shipping container* ~~corrugated steel sheet panel~~side walls and end walls shall be demonstrated by testing and analysis accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the p enetrations shall be substantiated by rational analysis.

3115.8.5 Simplified structural design <u>procedure</u> of single-unit containers. Single-unit *intermodal shipping containers* conforming to the limitations of Section 3115.8.5.1 shall be permitted to be designed in accordance with ~~the simplified structural design provisions of Section 3115.8.5.2~~ <u>Sections 3115.8.5.2 and 3115.8.5.3</u>.

3115.8.5.2 ~~Simplified structural~~ <u>Structural</u> design <u>assumptions</u>. Where permitted by Section 3115.8.5.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the~~corrugated steel shear~~ <u>side</u> walls <u>and end walls</u>:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R = 2.
3. Overstrength factor, Ω_0 = 2.5.
4. Deflection amplification factor, C_d = 2.
5. Limits on structural height, h_n = 9.5 feet (2900 mm).

3115.8.5.3 Allowable shear. The allowable shear for the ~~corrugated steel~~ intermodal shipping container side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3).
4. Where openings are made in the intermodal shipping container walls, floors or roofs, for doors, windows and other openings:
   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.
   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE 3115.8.5.3 ALLOWABLE SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER~~CORRUGATED STEEL~~SIDE WALLS AND END WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	CONTAINER DIMENSION (nominal length)	CONTAINER DIMENSION (nominal height)	ALLOWABLE SHEAR VALUES (PLF)[a, c]	
			Side Wall	End Wall
1EEE	45 feet	9.5 feet	75	843
1EE		8.5 feet		
1AAA	40 feet	9.5 feet	84	
1AA		8.5 feet		
1A		8.0 feet		
1AX		< 8.0 feet		
1BBB	30 feet	9.5 feet	112	
1BB		8.5 feet		
1B		8.0 feet		
1BX		< 8.0 feet		
1CC	20 feet	8.5 feet	168	
1C		8.0 feet		
1CX		< 8.0 feet		
1D	10 feet	8.0 feet	337	
1DX		< 8.0 feet		

For SI: 1 foot = 304.8 mm.

a. The allowable strength shear values for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.

b. Container designation type is derived from ISO 668.

c. Limitations of ~~Section~~ Sections 3115.8.5.1 and 3115.8.5.3 shall apply.

Reason: Most of the modifications contained in this code change proposal represent editorial changes to terminology as a result of comments received following the introduction of the Intermodal Shipping Container proposals in 2018 and 2019. These comments included concerns about redundancy and including language that is consistent with Chapter 16 Structural provisions.
3115.8.4. Proposed editorial change to the subsection title to insert the word "structural" to reflect that the design provision contained herein is structural in nature.

3115.8.4.2 Item 3. Proposed editorial change to reference the correct section. The intended section reference is supposed to be 3115.8.4.2 Item 1, not 3115.4.2 Item 1 as that section does not exist.

3115.8.4.2, 3115.8.5.2, 3115.8.5.3, and Table 3115.8.5.3. During the Code Action Hearing for the 2018 Group A Code Development Cycle, the Code Action Committee recommended to the proponent to change the wording as part of a public comment. This was inadvertently missed during the Public Comment Hearing. This proposed editorial change is to strike out the words "corrugated steel" and "sides" and replace with the words "intermodal shipping container" and "elements". The intent to emphasize the entirety of the structural elements (i.e., corrugated steel, top and bottom railing, and side columns) contributes to the lateral force resisting system and not just the individual corrugated steel component.

3115.8.5. Proposed editorial change to the subsection title to insert the word "procedure" reflect the emphasis on structural design procedure of this provision.

Table 3115.8.5.3. Proposed editorial change to the table footnote (a) to insert the word "value" to properly complete the sentence and table footnote (c) to include sections with the applicable conditions for using this table.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed changes are editorial in nature, does not change any technical requirement, and as a result should not have any impact on construction cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
3115.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the ~~intermodal shipping container~~ profiled steel panel elements are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7, Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials.
2. Where portions of the ~~intermodal shipping container~~ profiled steel panel elements are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7, Table 12.2-1.

3. Where portions of the ~~intermodal shipping container~~ profiled steel panel elements are retained and integrated into a seismic force-resisting system other than as permitted by Section 3115.8.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.4.3 Allowable shear value

The allowable shear values for the~~*intermodal shipping container*~~ profiled steel panel side walls and end walls shall be demonstrated by testing and analysis accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

3115.8.5.2 Structural design assumptions

Where permitted by Section 3115.8.5.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the profiled steel panel ~~side walls and end walls~~ lateral-force resisting system:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R = 2.
3. Overstrength factor, Ω_0 = 2.5.
4. Deflection amplification factor, C_d = 2.
5. Limits on structural height, h_n = 9.5 feet (2900 mm).

3115.8.5.3 Allowable shear

The allowable shear for the~~intermodal shipping container~~ profiled steel panel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3).
4. Where openings are made in the intermodal shipping container walls, floors or roofs, for doors, windows and other openings:
   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.

   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE 3115.8.5.3

ALLOWABLE SHEAR VALUES FOR ~~INTERMODAL SHIPPING CONTAINER~~ PROFILED STEEL PANEL SIDE WALLS AND END WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	CONTAINER DIMENSION (nominal length)	CONTAINER DIMENSION (nominal height)	ALLOWABLE SHEAR VALUES (PLF)[a, c]	
			Side Wall	End Wall
1EEE	45 feet	9.5 feet	75	843
1EE		8.5 feet		
1AAA	40 feet	9.5 feet	84	
1AA		8.5 feet		
1A		8.0 feet		
1AX		< 8.0 feet		
1BBB	30 feet	9.5 feet	112	
1BB		8.5 feet		
1B		8.0 feet		
1BX		< 8.0 feet		
1CC	20 feet	8.5 feet	168	
1C		8.0 feet		
1CX		< 8.0 feet		
1D	10 feet	8.0 feet	337	
1DX		< 8.0 feet		

For SI: 1 foot = 304.8 mm.

a. The allowable strength shear values for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.

b. Container designation type is derived from ISO 668.

c. Limitations of Sections 3115.8.5.1 and 3115.8.5.3 shall apply.

Committee Reason: The proposal was approved as modified by Proczka-1 and Proczka-2. With the modifications, the proposal is a coordinated good addition to the code and it clarifies the terminology related to intermodal shipping containers. The modifications provide needed editorial updates. (Vote: 11-3)

Final Hearing Results

G197-21	AM

G198-21

Original Proposal

IBC: 3115.8.2, 3115.8.4, 3115.8.4.2, 3115.8.5.3

Proponents: Julie Furr, Rimkus Consulting Group, Inc., Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, Wiss Janney Elstner Associates, Inc., Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, Federal Emergency Management Agency, Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov); Ronald LaPlante, Division of State Architect, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov)

2021 International Building Code

Revise as follows:

3115.8.2 Welds. The strength of new ~~New~~ welds and connections shall be no less ~~equal to or greater~~ than the strength provided by the original connections. All new welds and connections shall be designed and constructed in accordance with Chapters 16, 17, and 22.

3115.8.4 Detailed design procedure. A structural analysis meeting the requirements of this section shall be provided to the *building official* to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Structures using an intermodal ~~Intermodal~~ shipping container ~~containers~~ designed in accordance with Section 3115.8.5.

3115.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with ASCE 7 and one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7, Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials. ASCE 7 seismic provision exceptions, related to light-frame construction, shall not apply to the design of structures using intermodal shipping containers. The allowable shear values shall be determined in accordance with Section 3115.8.4.3.
2. Where all or portions of the corrugated steel container sides are ~~retained, but are~~ not considered to be part of the seismic force-resisting system, an independent seismic force-resisting system shall be selected~~, designed~~ and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where all or portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3). The existing door interlocking mechanism shall not be considered as a component of the required load path.

4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:
   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.

   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).

6. End wall doors designated as part of the lateral force-resisting system shall be welded closed~~.~~ around the full perimeter of the door panels.

Reason: Section 3115.8.2 is not clear as to what welds and connections this applies to, nor does it clarify what is meant by "equal to or greater than" (strength, size, or other). This change clarifies that it is the "strength" of the welds and connections that should be assessed for equivalency. The proposed language clarifies that new welds shall comply with minimum design standards as already specified elsewhere in the IBC.
Section 3115.8.4.2 is modified to include direct reference to ASCE 7 to capture the seismic design provisions, such as combination of seismic force-resisting systems, regardless of which of the 3 design items are selected. The first proposed change to Item 1 is to not permit simplified and relaxed requirements in ASCE 7, intended specifically for light-frame construction, to be applied to steel shipping containers since these containers may not exhibit similar seismic response characteristics as light-frame construction. The second proposed change to Item 1 is to tie the system seismic parameters to the system capacity by direct reference to Section 3115.8.4.3. This is also intended to further clarify that the allowable shear values contained in the simplified procedure shown in Table 3115.8.5.3 are not intended to be permitted with the detailed design procedure. The proposed changes in Items 2 and 3 are editorial to be consistent with Item 1.

Section 3115.8.5.3 is modified to ensure that the allowable shear in Table 3115.8.5.3 for the end wall with doors is based on an adequate load path between the door panels and boundary elements, as determined by established design theory. The perimeter welds of the end door panels are to be designed per Section 3115.8.2 and may be continuous or intermittent as required by design. These changes further clarify that the original mechanical locking mechanisms shall not be relied upon to function as a lateral force-resisting system component of the repurposed shipping container.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are editorial in nature and intended to clarify the design requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 3115.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).

2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).

3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3). The existing door interlocking mechanism shall not be considered as a component of the required load path.

4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:
   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.
   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be intermittently welded closed around the full perimeter of the door panels.

Committee Reason: The proposal was approved as modified by Furr-2 based on the committee actions on G197. The proposal, and modification, coordinate and clarify the welding, shear and seismic provisions. The proposal adds a pointer to ASCE 7 seismic provisions. The modification Furr-2 clarifies intermediate welding for Section 3115.8.5.3 item #6. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Truong Huynh, City of Long Beach, ICC Los Angeles Basin Chapter (truong.huynh@longbeach.gov); Jon-Paul Cardin, American Iron and Steel Institute, American Iron and Steel Institute (jcardin@steel.org); John-Jozef Proczka, City of Phoenix, self (john-jozef.proczka@phoenix.gov); Michael Mahoney, Federal Emergency Management Agency, Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3115.8.4.1 Material properties . Structural material properties for existing *intermodal shipping container* steel components shall be established by Section 2202. ~~material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test~~.

3115.8.4.2 Seismic design parameters . The seismic force-resisting system shall be designed and detailed in accordance with ASCE 7 and one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with AISI S100 and, ~~the~~ ASCE 7, Table 12.2-1 requirements for steel systems not specifically detailed for seismic resistance, excluding cantilever column systems. ~~light-frame bearing-wall systems with shear panels of all other materials. ASCE 7 seismic provision exceptions, related to light-frame construction, shall not apply to the design of structures using intermodal shipping containers. The allowable shear values shall be determined in accordance with Section 3115.8.4.3.~~
2. Where all or portions of the corrugated steel container sides are not considered to be part of the seismic force-resisting system, an independent seismic force-resisting system shall be selected and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where all or portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.4.3 Allowable shear value . The allowable shear values for the *intermodal shipping container* corrugated steel sheet panel side walls and end walls shall be determined in accordance with the design approach selected in Section 3115.8.4.2.~~demonstrated by testing and analysis accordance with Section 104.11.~~ Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

Commenter's Reason: This modification addresses two issues that have posed barriers to effective use of the Detailed Design Procedure, pertaining to how users must determine allowable shear values. This change was developed in collaboration with industry representatives and multiple interested parties.
As currently written:

1. Users must determine allowable shear capacities of the profiled steel panels by testing.
2. Users must comply with ASCE 7 seismic provisions for light-frame bearing wall systems, which are only applicable to light-frame stud and wood sheathing/gypsum board shear wall assemblies.

As modified:

1. Users are provided the option to use established industry standard methodologies to determine allowable shear capacities, requiring testing only if those methodologies are not applicable.
2. Users are directed to AISI S100, which is directly applicable to profiled steel panel shear wall assemblies.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This change reduces mandatory material testing requirements under the detailed design procedure.

Final Hearing Results

G198-21	AMPC1

G199-21 Part I

Original Proposal

PART I - IBC: 3301.1, 3301.2, [BS] 3301.2.1, SECTION 3302, 3302.1, 3302.1.1 (New), 3302.2, 3302.3, 3302.3.1 (New); IEBC: 1501.1, 1501.2, 1501.2.1, [BS] 1501.3, 1501.4, 1501.5, 1501.7, SECTION 1502(New), 1502.1(New), 1502.1.1(New), 1502.2(New), 1502.3(New), 1502.3.1(New), SECTION 1503(New), SECTION 1504(New)
PART II - IFC: 3303.1.1, 3303.3

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

SECTION 3301
GENERAL

Revise as follows:

3301.1 Scope. The provisions of this chapter shall govern safety during construction and the protection of adjacent public and private properties. <u>Fire safety during construction shall also comply with the applicable provisions of Chapter 33 of the International Fire Code</u>.

3301.2 Storage and placement <u>of construction equipment and materials</u>. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

[BS] <u>3301.3</u> ~~3301.2.1~~ <u>Roof</u> ~~Structural and construction~~ loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment *loads* that will be encountered during installation of the system.

<u>3301.4</u> ~~3302.1~~ <u>Maintenance of exits, existing structural elements, fire protection devices and sanitary safeguards</u>~~Alterations, repairs and additions.~~ Required *exits*, existing structural elements, fire protection devices and sanitary safeguards shall be maintained at all times during *alterations*, *repairs* or *additions* to any building or structure.

Exceptions:

1. Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required where the existing building is not occupied.

<u>3301.5</u> ~~3302.2~~ <u>Removal of waste materials</u>~~Manner of removal.~~ Waste materials shall be removed in a manner that prevents injury or damage to persons, adjoining properties and public rights-of-way.

Delete without substitution:

~~**3302.3 Fire safety during construction.** Fire safety during construction shall comply with the applicable requirements of this code and the applicable provisions of Chapter 33 of the International Fire Code.~~

Revise as follows:

SECTION 3302
<u>OWNER'S RESPONSIBILITY FOR FIRE PROTECTION</u>~~CONSTRUCTION~~

~~SAFEGUARDS~~

Add new text as follows:

3302.1 Site Safety Plan. The owner or owner's authorized agent shall be responsible for the development, implementation and maintenance of an approved, written site safety plan establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, alteration or demolition work. The plan shall be submitted and approved before a building permit is issued, Any changes to the plan shall address the requirements of this chapter and other applicable portions of the International Fire Code, the duties of staff, and staff training requirements. The plan shall be submitted for approval in accordance with the *International Fire Code.*

3302.1.1 Components of site safety plans. Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with the *International Fire Code.*
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *International Fire Code*.

3302.2 Site safety director. The owner shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the site safety plan. The site safety director shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided in accordance with the International Fire Code, the site safety director shall be responsible for the guard service.

3302.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site inspection and review.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in the *International Fire Code*, and hot work is performed only in areas approved by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.

5. Flammable liquids and other hazardous materials are stored in locations that have been approved by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by the *International Fire Code* are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3311.
10. Portable fire extinguishers are available in locations required by Sections 3309 and for roofing operations in accordance with the *International Fire Code*.
11. Where a fire watch is required, fire watch records complying with the International Fire Code are up-to-date.

3302.3.1 Violations. Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 114.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 114.2. Upon the third offense, the Building Official is authorized to issue a stop work order in accordance with Section 115, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the Building Official.

Reason: Correlation with IFC for provisions for construction site safety that a building inspector can reasonably verify and enforce while onsite doing other scheduled inspections. Clearly, building inspectors are plenty busy with scheduled inspections, and we are not looking to bog them down with additional work touring the site for safety violations. But, having them verify that required owner/manager site safety inspections are being documented is a minimal step to improving construction site safety. Also, IFC reference is moved to the scope for improved visibility and provisions have been added to clarify that a fire watch, where required, and associated records should be part of the safety play and records inspection.
It is recommended that the new section be scoped to the Fire Code for maintenance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Provisions being modified in the IBC are already in the IFC. Changes are for clarity and coordination between the codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted as the proposal is a good coordinated change and providing a link to the Chapter 33 of the International Fire Code in the scoping statement of Section 3301.1. (Vote: 12-2)

Final Hearing Results

G199-21 Part I	AS

G199-21 Part II

Original Proposal

PART II - IFC: 3303.1.1, 3303.3

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Revise as follows:

3303.1.1 Components of site safety plans. *Site safety plans* shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.8.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security <u>and, where required, for a fire watch</u>.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

3303.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site for presentation to the *fire code official* upon request.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in Chapter 35, and hot work is performed only in areas *approved* by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. *Flammable liquids* and other hazardous materials are stored in locations that have been *approved* by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by Section 3311 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm)

7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3313.1.
10. Portable fire extinguishers are available in locations required by Sections 3316 and 3318.3.
11. <u>Where a fire watch is required in accordance with Section 3305.5, fire watch records required by that section are up-to-date</u>.

Reason: Correlation with IFC for provisions for construction site safety that a building inspector can reasonably verify and enforce while onsite doing other scheduled inspections. Clearly, building inspectors are plenty busy with scheduled inspections, and we are not looking to bog them down with additional work touring the site for safety violations. But, having them verify that required owner/manager site safety inspections are being documented is a minimal step to improving construction site safety. Also, IFC reference is moved to the scope for improved visibility and provisions have been added to clarify that a fire watch, where required, and associated records should be part of the safety play and records inspection.
It is recommended that the new section be scoped to the Fire Code for maintenance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Provisions being modified in the IBC are already in the IFC. Changes are for clarity and coordination between the codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved based upon the reason statement. It was suggested that perhaps the phrase "up-to-date" could be revised in Section 3303.3. (Vote: 13-0)

Final Hearing Results

G199-21 Part II AS

S1-21

Original Proposal

IBC: [BF] 1505.1

Proponents: Aaron R. Phillips, Asphalt Roofing Manufacturers Association, Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BF] 1505.1 General. Fire classification of *roof assemblies* shall be in accordance with Section 1505.~~*Roof assemblies* shall be divided into the classes defined in this section.~~ The minimum fire classification of *roof assemblies* installed on buildings shall comply with Table 1505.1 based on type of construction of the building. Class A, B and C *roof assemblies* and *roof coverings* required to be listed by this section shall be tested in accordance with ASTM E108 or UL 790. In addition, *fire-retardant-treated wood roof coverings* shall be tested in accordance with ASTM D2898. ~~The minimum *roof coverings* installed on buildings shall comply with Table 1505.1 based on the type of construction of the building.~~

Exception: *Skylights and sloped glazing* that comply with Chapter 24 or Section 2610.

Reason: The initial sentence of Section 1505.1 is modified to clarify that Section 1505 establishes fire classification requirements of roof assemblies instead of a requirement to divide roof assemblies into classes. A new sentence is introduced as a replacement for the final sentence. It clarifies that Table 1505.1 provides the minimum fire classification for roof assemblies based on type of construction, rather than the "minimum roof covering," which is a vague and potentially confusing phrase. Rearrangement of the section makes it read more logically and improves clarity.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies code language and rearranges existing provisions. These changes are not expected to affect cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1505.1 MINIMUM ROOF ASSEMBLY~~COVERING~~ CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[c]	B	C[c]	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the*International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified roof coverings shall be permitted on buildings of Group R-3 and Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

Committee Reason: The committee determined the modification makes TABLE 1505.1 consistent with the proposal. The committee based their approval on the proponent's reason statement and concluded the code change clarifies the existing language. The committee suggested fixing TABLE 1505.1 footnote b, "Nonclassified roof coverings" to "Nonclassified roof assembly" in the public comment phase. (Vote: 12-1)

Final Hearing Results

S1-21	AM

S1-22

Original Proposal

IBC: 1502.3

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Delete without substitution:

~~**1502.3 Scuppers.** Where *scuppers* are used for secondary (emergency overflow) roof drainage, the quantity, size, location and inlet elevation of the *scuppers* shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1611.1. *Scuppers* shall not have an opening dimension of less than 4 inches (102 mm). The flow through the primary system shall not be considered when locating and sizing *scuppers*.~~

Reason: IBC's Section 1502.3-Scuppers provides requirements for scuppers used as secondary (emergency overflow) roof drainage that are identical to those in IPC's Section 1106.5-Parapet Wall Scuppers and Section 1108-Secondary (Emergency) Roof Drains. IBC's Section 1502.1-General and Section 1502.2-Secondary (Emergency Overflow) Drains or Scuppers already provide pointers to the IPC. This proposal deletes the redundant requirement in IBC Section 1502.3-Scuppers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal eliminates redundant language. There is no change in technical requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this proposal removes duplication and ambiguity with the IPC. (Vote: 10-4)

Final Hearing Results

S1-22	AS

S2-21

Original Proposal

IBC: TABLE 1505.1

Proponents: Aaron R. Phillips, Asphalt Roofing Manufacturers Association, Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

TABLE 1505.1 MINIMUM ROOF COVERING CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[c]	B	C[c]	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the*International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified roof coverings shall be permitted on buildings of~~Group R-3 and~~ Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

Reason: This proposal removes the existing permission to use nonclassifed roof coverings on buildings of Group R-3 occupancy. The option permitting nonclassified roof coverings on buildings in Group R-3 has been present in all versions of the IBC back to and including the 2000 edition. However, the description of Group R-3 occupancy in the 2000 IBC differs from successive editions; it includes buildings with no more than two dwelling units or adult and child care facilities that accommodate no more than five people for less than 24 hours. IBC editions from 2003 through 2021 include within Group R-3 buildings with up to sixteen occupants.
In the 2021 IBC, Group R-3 occupancies have occupants who are primarily permanent, and this Group encompasses those buildings not within Groups R-1, R-2, R-4 or I. Among the building uses included in Group R-3 are congregate living facilities with up to sixteen nontransient occupants; these buildings are permitted to use nonclassified roof coverings. In comparison, Group R-1 includes congregate living facilities with more than ten transient occupants, yet does not permit nonclassified roof coverings. As an additional example, Group R-4 occupancies are restricted to between six and sixteen occupants, excluding staff. Both Groups R-1 and R-4 include buildings in which the number of occupants may be less than the number permitted in a building that falls within Group R-3, yet both Groups R-1 and R-4 do not permit nonclassified roof coverings.

The acceptance of nonclassified roof coverings on Group R-3 buildings is puzzling since all other residential groups require classified roof coverings, and the number of occupants permitted in some Group R-3 buildings is greater than the number permitted in some Group R-1 and R-4 buildings. The current situation, which permits nonclassified roof coverings on Group R-3 buildings, may increase the life safety hazard to occupants of these buildings and is worthy of reconsideration.

Cost Impact: The code change proposal will increase the cost of construction
The cost of classified roof coverings may be higher than the cost of non-classified roof covers in some situations.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal is a good change in the direction of safety. As indicated by manufacturers, there are many designs that people can choose from. This proposal is not a limiting factor. One of the committee members mentioned this proposal contradicts with an exception in the IRC. (Vote: 11-2)

Final Hearing Results

S2-21	AS

S3-21

Original Proposal

IBC: [BF] 1505.2

Proponents: Aaron R. Phillips, Asphalt Roofing Manufacturers Association, Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BF] 1505.2 Class A roof assemblies. Class A *roof assemblies* are those that are effective against severe fire test exposure. Class A *roof assemblies* and *roof coverings* shall be *listed* and identified as Class A by an *approved* testing agency. Class A *roof assemblies* shall be permitted for use in buildings or structures of all types of construction.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete roof deck.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 ounce per square foot (0.0416 kg/m^2) copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over ASTM D226, Type II <u>or ASTM D4869, Type IV</u> *underlayment* over combustible decks.

Reason: Exception 4 was added to Section 1505.2 via proposal S20 in the code development cycle that created the 2015 edition. The supporting information for S20 included test data substantiating the Class A classification of a roof assembly that comprises slate shingles and ASTM D226 Type II underlayment installed on a combustible deck. This proposal recommends addition of ASTM D4869 Type IV underlayment as an alternative to D226 Type II in Exception 4 based on equivalent compositional requirements. The minimum masses of saturated felt, saturant, and desaturated felt are equivalent for both ASTM D226 Type II and ASTM D4869 Type IV saturated felts. Because the compositional requirements of ASTM D226 Type II and ASTM D4869 Type IV saturated felts are equivalent, the behavior in a UL 790 or ASTM E108 fire test can be expected to be equivalent.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an alternative underlayment option, which can generally be expected to increase competitiveness in the market. No change in cost of construction is anticipated.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement and concluded the code change correlates the existing code text. (Vote: 13-0)

Final Hearing Results

S3-21 AS

S5-22

Original Proposal

IBC: 1503.4

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1503.4 Attic and rafter ventilation. Ventilation of *attic* and enclosed rafter assemblies ~~Intake and exhaust vents~~ shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.

Exception: Unvented attic and unvented enclosed rafter assemblies shall be permitted in accordance with Section 1202.3.

Reason: This code change proposal is intended to clarify the code's existing requirements requirements regarding attic and enclosed rafter ventilation. The words "... attic and enclosed rafter assemblies... are added to clarify the scoping of the requirement. An exception is added to direct users to Section 1202.3 to the code's provisions unvented attics and unvented enclosed rafters.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal has no cost impact. It simply clarifies the code's existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1503.4 Attic and rafter ventilation. Intake and exhaust vents for v~~V~~entilation of *attic* and enclosed rafter assemblies shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.

Exception: Unvented attic and unvented enclosed rafter assemblies shall be permitted in accordance with Section 1202.3.

Committee Reason: Approved as modified as the proposal provided clarification and needed direction for unvented attics and unvented enclosed rafter assemblies. The modification clarifies the section by returning the first sentence of 1503.4 to the existing code language. (Vote: 14-0)

Final Hearing Results

S5-22	AM

S6-21

Original Proposal

IBC: 1511.1.1

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-GENERAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BG] 1511.1.1 Area limitation. The aggregate area of *penthouses* and other enclosed *rooftop structures* shall not exceed one-third the area of the supporting roof deck. Such *penthouses* and other enclosed *rooftop structures* shall not be required to be included in determining the ~~*building area* or number of stories~~*building height*, number of *stories* or *building area* as regulated by Section 503.1. The area of such *penthouses* shall not be included in determining the *fire area* specified in Section 901.7.

Reason: This proposal clarifies that penthouses and other enclosed rooftop structures are not required to be included in the building height. This section already states that these structures are not included in the number of stories and Section 1510.2.1 has penthouse height limits above the roof deck, which are independent of building height limitations in Section 503.1. Based on this, it is believed the intent of the code is that the height of these types of structures is only regulated in terms above height above the roof deck.

The commentary for the definition of "building height" indicates that since a penthouse is defined as a structure that is built above the roof of a building, it is above the point to which building height is measured. Therefore a penthouse would not affect the measurement of the building height and can be located above the maximum allowed roof height. However, per definition in Section 202, "building height" is measured to the average height of the highest roof surface so it must be clarified in the code that the roof surface of penthouses and other enclosed rooftop structures are not considered in the building height.

Also, it should be noted that the wording in this proposal is revised/re-ordered to "*building height*, number of *stories* or *building area*" simply to match the wording in Section 503.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to be a clarification that will not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it matches the intent of the code and is a good clarification. (Vote: 14-0).

Final Hearing Results

S6-21 AS

S6-22

Original Proposal

IBC: 1504.1

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1504.1 Wind resistance of roofs. *Roof decks* and *roof coverings* shall be designed ~~for wind *loads*~~ in accordance with ~~Chapter 16~~ and this Section~~s 1504.2, 1504.3 , 1504.4 and 1504.5~~.

Reason: This code change proposal is intended to clarify this section's intent. This code change proposal is not intended to change the code's technical requirements or stringency.

Currently, Section 1504.1 indicates roof decks and roof coverings "...shall be designed for *wind loads*..." While this is true for some of the roof covering types in this section, some other roof covering types are designed by classifications based on the maximum basic wind speed maps. For example, asphalt shingle roof coverings are designed for wind resistance based on classifications in Table 1504.2.

Also, the change striking "...Sections 1504.2, 1504.3, 1504. and 1504.5..." and replacing it with "...this Section." is intended to appropriately reference the requirements entire section. Over the years and code development cycles, this section has been added to without updating the subsection pointers in Section 1504.1. Changing this pointer to "...this Section." addresses this and also will address any future additions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This code change proposal is a clarification of the code's existing requirements; it does not change the code's technical requirements or stringency.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1504.1 Wind resistance of roofs. *Roof decks* and *roof coverings* shall be designed in accordance with ~~and this~~ Section 1504.

Committee Reason: Approved as modified as the proposal gives clarity and deletes the unnecessary reference to Chapter 16. The modification fixes a typo and improves the flow. (Vote: 14-0)

Final Hearing Results

S6-22 AM

S7-21

Original Proposal

IBC: [BG] 1511.2.4

Proponents: David Renn, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-GENERAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BG] 1511.2.4 Type of construction. Penthouses shall be constructed of ~~building elements~~ *building element* materials as required for the type of construction of the building ~~on which such penthouses are buil~~t. Penthouse *exterior walls* and roof construction shall have a *fire-resistance rating* as required for the type of construction of the building. Supporting construction of such *exterior walls* and roof construction shall have a *fire-resistance rating* not less than required for the *exterior wall* or roof supported.

Exceptions:

1. On buildings of Type I construction, the *exterior walls* and roofs of *penthouses* with a *fire separation distance* greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour *fire-resistance rating*. The *exterior walls* and roofs of *penthouses* with a *fire separation distance* of 20 feet (6096 mm) or greater shall not be required to have a *fire-resistance rating*.
2. On buildings of Type I construction two stories or less in height above *grade plane* or of Type II construction, the *exterior walls* and roofs of *penthouses* with a *fire separation distance* greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour *fire-resistance rating* or a lesser *fire-resistance rating* as required by Table 705.5 and be constructed of *fire-retardant-treated wood*. The *exterior walls* and roofs of *penthouses* with a *fire separation distance* of 20 feet (6096 mm) or greater shall be permitted to be constructed of *fire-retardant-treated wood* and shall not be required to have a *fire-resistance rating*. Interior framing and walls shall be permitted to be constructed of *fire-retardant-treated wood*.
3. On buildings of Type III, IV or V construction, the *exterior walls* of *penthouses* with a *fire separation distance* greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour *fire-resistance rating* or a lesser *fire-resistance rating* as required by Table 705.5. On buildings of Type III, IV or VA construction, the *exterior walls* of *penthouses* with a *fire separation distance* of 20 feet (6096 mm) or greater shall be permitted to be of heavy timber construction complying with Sections 602.4 and 2304.11 or noncombustible construction or *fire-retardant-treated wood* and shall not be required to have a *fire-resistance rating*.

Reason: The 2021 IBC changed penthouse construction requirements to be as required for building elements based on type of construction instead of requiring walls, floors and roofs to be as required for the type of construction. This change results in overly conservative fire-resistance ratings when the exceptions to this section are used since the exceptions only reduce ratings for exterior walls and roofs. For example, Exception 1 could allow exterior walls and roofs to not have a fire-resistance rating; however, the exception doesn't apply to the secondary members supporting the roof, primary structural frame supporting the roof, or interior bearing walls supporting the roof. The resul would be a non-rated roof supported by a primary structural frame with a 1 or 2-hour rating, secondary members with a 1 or 1 1/2-hour framing and interior bearing walls with a 1 or 2-hour rating.

Prior to the 2021 change, IBC Section 704.1 required the fire-resistance rating of supporting construction for penthouse exterior walls and roofs to be not less than the rating of the wall or roof supported. This level of protection is appropriate for a penthouse that is constructed above the roof of the building and is not considered to be part of the primary structural frame of the building. This proposal makes this clear by putting this requirement into the penthouse requirements rather than relying on Section 704.1.

This proposal also removes the requirement that penthouse floors be constructed as required for the type of construction. By definition, rooftop structures (including penthouses) are constructed over the roof deck of the building, so the the fire-resistance rating of the roof of the building should be allowed for the "floor" of the penthouse.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will reduce the required fire-resistance rating requirements for penthouses which will result in a decreased cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it revises the language to meet the intent and corrects what could have been misread. (Vote: 13-1)

Final Hearing Results

S7-21	AS

S7-22

Original Proposal

IBC: 1504.4.4 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

1504.4.4 Slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate packaging shall bear a label indicating compliance with ASTM D3161 and the required classification in Table 1504.2.

Reason: This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings. Wind resistance of slate roof coverings is not currently addressed in the IBC. This code change adds wind resistance testing in accordance with ASTM D3161 and its classification designations similar to what is already provided for in the IBC for asphalt shingles and metal roof shingles. Existing Table 1504.2 is referenced providing the required wind resistance classification based on the maximum basic wind speed, V, or maximum allowable stress design wind speed, Vasd. Slate package labeling is required to facilitate classification identification and enforcement. Such package labeling would be slate supplier specific, but most likely would be in the form of of a pallet tag.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While this code change proposal adds a requirement for wind resistance testing, it will not result in an increase in the cost of construction. Slate suppliers have indicating they already have ASTM D3161 testing in-place and classifications available.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provides the needed testing requirements for slate shingles. (Vote: 14-0)

Final Hearing Results

S7-22	AS

S8-22

Original Proposal

IBC: SECTION 202 (New), SECTION 202, 1504.5, 1504.6, 1504.6.1, 1504.7, 1504.8, 1507.12.3

Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com)

2021 International Building Code

Add new definition as follows:

LOW-SLOPE. A roof slope two units vertical in 12 units horizontal (17-percent slope) or less.

Revise as follows:

[BF] STEEP-SLOPE. A roof slope greater than 2 units vertical in 12 units horizontal (17-percent slope)~~or greater~~.

1504.5 Ballasted low-slope single-ply roof systems. Ballasted low-slope ~~(roof slope < 2:12)~~ single-ply roof system coverings installed in accordance with Section 1507.12 shall be designed in accordance with ANSI/SPRI RP-4.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems ~~having a slope less than 2 units vertical in 12 units horizontal (2:12~~o) n a *low slope* roof shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

1504.6.1 Gutter securement for low-slope roofs. Gutters that are used to secure the perimeter edge of the roof membrane on low-slope ~~(less than 2:12 slope~~) built-up, modified bitumen, and single-ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

1504.7 Physical properties. *Roof coverings* installed on low-slope roofs ~~(roof slope < 2:12)~~ in accordance with Section 1507 shall demonstrate physical integrity over the working life of the roof based on 2,000 hours of exposure to accelerated weathering tests conducted in accordance with ASTM G152, ASTM G154 or ASTM G155. Those *roof coverings* that are subject to cyclical flexural response due to wind *loads* shall not demonstrate any significant loss of tensile strength for unreinforced membranes or breaking strength for reinforced membranes when tested as herein required.

1504.8 Impact resistance. *Roof coverings* installed on low-slope roofs ~~(roof slope < 2:12)~~ in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the "Resistance to Foot Traffic Test" in FM 4470.

1507.12.3 Ballasted low-slope roofs. Ballasted low-slope roofs ~~(roof slope < 2:12)~~ shall be installed in accordance with this section and Section 1504.5. Stone used as *ballast* shall comply with ASTM D448 or ASTM D7655.

Reason: This proposal addresses an inconsistency in the code. Per referenced standard ANSI/SPRI/FM 4435-ES-1–17 a low slope roof is one with a slope of 2:12 or less (e.g. ≤2:12), but the references in section 1504 to low-slope are less than 2:12 (e.g. < 2:12). This proposal corrects these discrepancies and adds a definition of Low-Slope. The definition of steep slope has subsequently been revised to reference roof slopes greater than 2:12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is just and editorial correction therefore no cost is associated with it.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

~~or~~

LOW-SLOPE. A roof slope less than two units vertical in 12 units horizontal (17-percent slope)l~~ess~~ .

[BF] STEEP-SLOPE. A roof slope ~~greater than~~ 2 units vertical in 12 units horizontal (17-percent slope)or greater.

Committee Reason: Approved as modified as the proposal defines 'low-slope' and 'steep-slope' roofs consistent with the usage in Chapter 15. The modification adds clarity consistent with current code usage. (Vote: 14-0)

Final Hearing Results

S8-22	AM

S9-22

Original Proposal

IBC: SECTION 202, [BS] 1404.16, [BS] 1404.18, 1504.6, 1504.9; IBC: TABLE 1504.9; IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), 1507.16.8, 1602.1, 1603.1, 1603.1.4, TABLE 1604.3, 1609.1.1, TABLE 1609.2, 1609.2.2, 1609.3, 1609.3.1, TABLE 1609.3.1, 1705.12, 2304.6.1, TABLE 2304.10.2, TABLE 2308.7.5, 2404.1, 2404.2, 2404.3.1, 2404.3.3, 2404.3.5, 2405.5.2

Proponents: Emily Guglielmo, NCSEA Wind Committee (eguglielmo@martinmartin.com); Don Scott, ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

[BS] BASIC WIND SPEED, *V*.

~~Basic design wind speeds.~~ The wind speed used for design, as determined in Chapter 16.

[BS] HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The US Atlantic Ocean and Gulf of Mexico coasts where the basic~~design~~ wind speed, *V*, for Risk Category II buildings is greater than 115 mph (51.4 m/s);
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

[BS] WINDBORNE DEBRIS REGION. Areas within *hurricane-prone regions* located:

1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic ~~design~~ wind speed, *V*, is 130 mph (58 m/s) or greater; or
2. In areas where the basic ~~design~~ wind speed, V, is 140 mph (63 m/s) or greater.

For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609.3.(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the windborne debris region shall be based on Figure 1609.3(2).

[BS] 1404.16 Fiber-cement siding. *Fiber-cement siding* complying with Section 1403.10 shall be permitted on *exterior walls* of Type I, II, III, IV and V construction for wind pressure resistance or basic wind speed exposures as indicated by the manufacturer's listing and *label* and *approved* installation instructions. Where specified, the siding shall be installed over sheathing or materials listed in Section 2304.6 and shall be installed to conform to the *water-resistive barrier* requirements in Section 1402. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding to wood studs shall be corrosion-resistant round head smooth shank and shall be long enough to penetrate the studs not less than 1 inch (25 mm). For cold-formed steel *light-frame construction*, corrosion-resistant fasteners shall be used. Screw fasteners shall penetrate the cold-formed steel framing not fewer than three exposed full threads. Other fasteners shall be installed in accordance with the approved construction documents and manufacturer's instructions.

[BS] 1404.18 Polypropylene siding. *Polypropylene siding* conforming to the requirements of this section and complying with Section 1403.12 shall be limited to *exterior walls* located in areas where the basic wind speed, V, specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed, V, exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. *Polypropylene siding* shall be installed in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the building so as to provide weather protection for the *exterior walls* of the building.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic ~~design~~ *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASICDESIGN WIND SPEED, V (MPH)																	
		Exposure B									Exposure C[d]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic ~~design~~ wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

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Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for ~~design~~ basic wind speeds, V, less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.

2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Clay and concrete tile	1507.3	For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* < 140 MPH	End laps shall be 4 inches and shall be offset by 6 feet. MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* ≥ 140 MPH
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

1507.16.8 Wind resistance. *Photovoltaic shingles* shall comply with the classification requirements of Table 1504.2 for the appropriate maximum ~~nominal design~~ basic wind speed, V.

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph)~~(km/hr)~~ (m/s) where applicable.
V	=	Basic ~~design~~ wind speed, V, miles per hour (mph)~~(km/hr)~~ (m/s) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.

W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

1603.1 General. *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

Exception: *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof dead and live loads.
2. Ground snow load, p_g.
3. Basic ~~design~~ wind speed, *V*, miles per hour (mph) ~~(km/hr)~~ (m/s) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
4. *Seismic design category* and *site class*.
5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
6. Design load-bearing values of soils.
7. Rain load data.

1603.1.4 Wind design data. The following information related to wind *loads* shall be shown, regardless of whether wind *loads* govern the design of the lateral force-resisting system of the structure:

1. Basic ~~design~~ *wind speed*, *V*, miles per hour and *allowable stress design wind speed*, V_{asd}, as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, pounds per square foot (kN/m^2).

TABLE 1604.3 DEFLECTION LIMITS[a, b, c, h, i]

CONSTRUCTION	*L or L_r*	*S or W*[f]	*D + L*[d, g]
Roof members:[e]			
Supporting plaster or stucco ceiling	*l*/360	*l*/360	*l*/240
Supporting nonplaster ceiling	*l*/240	*l*/240	*l*/180
Not supporting ceiling	*l*/180	*l*/180	*l*/120
Floor members	*l*/360	—	*l*/240
Exterior walls:			
With plaster or stucco finishes	—	*l*/360	—
With other brittle finishes	—	*l*/240	—
With flexible finishes	—	*l*/120	—
Interior partitions:[b]			
With plaster or stucco finishes	*l*/360	—	—

CONSTRUCTION	*L or L*	*S or W*	*D + L*
With other brittle finishes	*l*/240	—	—
With flexible finishes	*l*/120	—	—
Farm buildings	—	—	*l*/180
Greenhouses	—	—	*l*/120

For SI: 1 foot = 304.8 mm.

a. For structural roofing and siding made of formed metal sheets, the total load deflection shall not exceed *l*/60. For secondary roof structural members supporting formed metal roofing, the live load deflection shall not exceed *l*/150. For secondary wall members supporting formed metal siding, the design wind load deflection shall not exceed *l*/90. For roofs, this exception only applies when the metal sheets have no roof covering.

b. Flexible, folding and portable partitions are not governed by the provisions of this section. The deflection criterion for interior partitions is based on the horizontal load defined in Section 1607.16 .

c. See Section 2403 for glass supports.

d. The deflection limit for the $D+(L+L_r)$ load combination only applies to the deflection due to the creep component of long-term dead load deflection plus the short-term live load deflection. For lumber, structural glued laminated timber, prefabricated wood I-joists and structural composite lumber members that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection shall be permitted to be estimated as the immediate dead load deflection resulting from 0.5*D*. For lumber and glued laminated timber members installed or used at all other moisture conditions or cross laminated timber and wood structural panels that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection is permitted to be estimated as the immediate dead load deflection resulting from *D*. The value of 0.5*D* shall not be used in combination with ANSI/AWC NDS provisions for long-term loading.

e. The preceding deflections do not ensure against ponding. Roofs that do not have sufficient slope or camber to ensure adequate drainage shall be investigated for ponding. See Chapter 8 of ASCE 7.

f. The wind load shall be permitted to be taken as 0.42 times the "component and cladding" loads or directly calculated using the 10-year mean return interval basic wind speed, V, for the purpose of determining deflection limits in Table 1604.3. Where framing members support glass, the deflection limit therein shall not exceed that specified in Section 1604.3.7

g. For steel structural members, the deflection due to creep component of long-term dead load shall be permitted to be taken as zero.

h. For aluminum structural members or aluminum panels used in skylights and sloped glazing framing, roofs or walls of sunroom additions or patio covers not supporting edge of glass or aluminum sandwich panels, the total load deflection shall not exceed *l*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *l*/175 for each glass lite or *l*/60 for the entire length of the member, whichever is more stringent. For aluminum sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *1*/120.

i. *l* = Length of the member between supports. For cantilever members, l shall be taken as twice the length of the cantilever.

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic ~~design~~ *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.

2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic~~design~~ wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

TABLE 1609.2 WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE FOR WOOD STRUCTURAL PANELS[a, b, c, d]

FASTENER TYPE	FASTENER SPACING (inches)		
	Panel Span ≤ 4 feet	4 feet < Panel Span ≤ 6 feet	6 feet < Panel ≤ Span 8 feet
No. 8 wood-screw-based anchor with 2-inch embedment length	16	10	8
No. 10 wood-screw-based anchor with 2-inch embedment length	16	12	9
1/4-inch diameter lag-screw-based anchor with 2-inch embedment length	16	16	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N, 1 mile per hour = 0.447 m/s.

a. This table is based on a 140 mph basic wind speed~~s~~, V, and a 45-foot mean roof height.

b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located not less than 1 inch from the edge of the panel.

c. Anchors shall penetrate through the exterior wall covering with an embedment length of 2 inches minimum into the building frame. Fasteners shall be located not less than $2^1/_2$ inches from the edge of concrete block or concrete.

d. Where panels are attached to masonry or masonry/stucco, they shall be attached using vibration-resistant anchors having a minimum ultimate withdrawal capacity of 1,500 pounds.

1609.2.2 Application of ASTM E1996. The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows:
6.2.2 Unless otherwise specified, select the wind zone based on the basic~~design~~ *wind speed*, *V*, as follows:

6.2.2.1 *Wind Zone 1*—130 mph ≤ basic ~~design~~ *wind speed*, *V* < 140 mph.

6.2.2.2 *Wind Zone 2*—140 mph ≤ basic ~~design~~ *wind speed*, *V* < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.3 *Wind Zone 3*—150 mph (67 m/s) ≤ basic ~~*design*~~ *wind speed*, *V* ≤ 160 mph (72 m/s), or 140 mph (63 m/s) ≤ basic~~design~~ *wind speed*, *V* ≤ 160 mph (72 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.4 *Wind Zone 4*— basic ~~design~~ *wind speed*, *V* > 160 mph (72 m/s).

1609.3 Basic ~~design~~ wind speed. The basic ~~design~~ *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through 1609.3(12). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* II buildings and structures shall be obtained from Figures 1609.3(1), 1609.3(5) and 1609.3(6). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* III buildings and structures shall be obtained from Figures 1609.3(2), 1609.3(7) and 1609.3(8). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* IV buildings and structures shall be obtained from Figures 1609.3(3), 1609.3(9) and 1609.3(10). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* I buildings and structures shall be obtained from Figures 1609.3(4), 1609.3(11) and 1609.3(12). The basic ~~design~~ *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic ~~design~~ wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.
In nonhurricane-prone regions, when the basic ~~*design*~~ *wind speed*, *V*, is estimated from regional climatic data, the basic ~~design~~ *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.

1609.3.1 Wind speed conversion. Where required, the basic ~~design~~ wind speed, V, of Figures 1609.3(1) through 1609.3(12) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6}$$ **(Equation 16-17)**

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3(12).

TABLE 1609.3.1 WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.

c. V = basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3(12).

1705.12 Special inspections for wind resistance. *Special inspections* for wind resistance specified in Sections 1705.12.1 through 1705.12.3, unless exempted by the exceptions to Section 1704.2, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where *basic wind speed, V* is 150 miles per hour (67 m/sec) or greater.
2. In wind Exposure Category C or D, where *basic wind speed, V* is 140 mph (62.6 m/sec) or greater.

2304.6.1 Wood structural panel sheathing. Where *wood structural panel* sheathing is used as the exposed finish on the outside of *exterior walls*, it shall have an exterior exposure durability classification. Where *wood structural panel* sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). *Wood structural panel* sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable allowable stress design wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.

TABLE 2304.10.2 FASTENING SCHEDULE

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION
	Roof	
1. Blocking between ceiling joists, rafters or trusses to top plate or other framing below	4-8d box (2 1/2″ x 0.113″); or 3-8d common (2 1/2″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″14 gage staples, 7/16″ crown	Each end, toenail
Blocking between rafters or truss not at the wall top plate, to rafter or truss	2-8d common (2 1/2″ × 0.131″) 2-3″ × 0.131″ nails 2-3″ 14 gage staples	Each end, toenail
	2-16 d common (3 1/2″ × 0.162″) 3-3″ × 0.131″ nails 3-3″ 14 gage staples	End nail
Flat blocking to truss and web filler	16d common (3 1/2″ × 0.162″) @ 6″ o.c. 3″ × 0.131″ nails @ 6″ o.c. 3″ × 14 gage staples @ 6″ o.c	Face nail
2. Ceiling joists to top plate	4-8d box (2 1/2″ x 0.113″); or 3-8d common (2 1/2″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, 7/16″ crown	Each joist, toenail
3. Ceiling joist not attached to parallel rafter, laps over partitions (no thrust) (see Section 2308.7.3.1, Table 2308.7.3.1)	3-16d common (3 1/2″ × 0.162″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, 7/16″ crown	Face nail

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
4. Ceiling joist attached to parallel rafter (heel joint) (see Section 2308.7.3.1, Table 2308.7.3.1)	Per Table 2308.7.3.1	Face nail
5. Collar tie to rafter	3-10d common (3″ × 0.148″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	Face nail
6. Rafter or roof truss to top plate (See Section 2308.7.5, Table 2308.7.5)	3-10 common (3″ × 0.148″); or 3-16d box ($3^{1}/_{2}$″ × 0.135″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131 nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	2 toenails on one side and 1 toenail on opposite side of rafter or truss[c]
7. Roof rafters to ridge valley or hip rafters; or roof rafter to 2-inch ridge beam	2-16d common ($3^{1}/_{2}$″ × 0.162″); or 3-16d box ($3^{1}/_{2}$″ × 0.135″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	End nail
	3-10d common ($3^{1}/_{2}$″ × 0.148″); or 4-16d box ($3^{1}/_{2}$″ × 0.135″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	Toenail
Wall		
8. Stud to stud (not at braced wall panels)	16d common ($3^{1}/_{2}$″ × 0.162″);	24″ o.c. face nail
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	16″ o.c. face nail
9. Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d common ($3^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail
	16d box ($3^{1}/_{2}$″ × 0.135″); or 3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	12″ o.c. face nail
10. Built-up header (2″ to 2″ header)	16d common ($3^{1}/_{2}$″ × 0.162″)	16″ o.c. each edge, face nail
	16d box ($3^{1}/_{2}$″ × 0.135″)	12″ o.c. each edge, face nail
11. Continuous header to stud	4-8d common ($2^{1}/_{2}$″ × 0.131″); or 4-10d box (3″ × 0.128″); or 5-8d box ($2^{1}/_{2}$″ x 0.113″)	Toenail
12. Top plate to top plate	16d common ($3^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, $^{7}/_{16}$″ crown	12″ o.c. face nail
13. Top plate to top plate, at end joints	8-16d common ($3^{1}/_{2}$″ × 0.162″); or 12-16d box ($3^{1}/_{2}$″ x 0.135″); or 12-10d box (3″ × 0.128″); or 12-3″ × 0.131″ nails; or 12-3″ 14 gage staples, $^{7}/_{16}$″ crown	Each side of end joint, face nail (minimum 24" lap splice length each side of end joint)
14. Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common ($3^{1}/_{2}$″ × 0.162″)	16″ o.c. face nail
	16d box ($3^{1}/_{2}$″ × 0.135″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, $^{7}/_{16}$″ crown	12″ o.c. face nail
15. Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	2-16d common ($3^{1}/_{2}$″ × 0.162″); or 3-16d box ($3^{1}/_{2}$″ × 0.135″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	16″ o.c. face nail
16. Stud to top or bottom plate	3-16d box ($3^{1}/_{2}$″ x 0.135″); or 4-8d common ($2^{1}/_{2}$″ × 0.131″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-8d box ($2^{1}/_{2}$″ x 0.113″); or 4-3″ 14 gage staples, $^{7}/_{16}$″ crown	Toenail
	2-16d common ($3^{1}/_{2}$″ × 0.162″); or 3-16d box ($3^{1}/_{2}$″ x 0.135″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	End nail
17. Top plates, laps at corners and intersections	2-16d common ($3^{1}/_{2}$″ × 0.162″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, $^{7}/_{16}$″ crown	Face nail
18. 1″ brace to each stud and plate	3-8d box ($2^{1}/_{2}$″ x 0.113″); or 2-8d common ($2^{1}/_{2}$″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2-3″ × 0.131″ nails; or 2-3″ 14 gage staples, $^{7}/_{16}$″ crown	Face nail
DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION

19. 1″ × 6″ sheathing to each bearing	3-8d box (2 1/2″ x 0.113″); or 2-8d common (2 1/2″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2-1 3/4″ 16 gage staples, 1″ crown	Face nail	
20. 1″ × 8″ and wider sheathing to each bearing	3-8d common (2 1/2″ × 0.131″); or 3-8d box (2 1/2″ x 0.113″); or 3-10d box (3″ × 0.128″); or 3-1 3/4″ 16 gage staples, 1″ crown	Face nail	
	Wider than 1″ × 8″ 3-8d common (2 1/2″ x 0.131″); or 4-8d box (2 1/2″ × 0.113″); or 3-10d box (3″ × 0.128″); or 4-1 3/4″ 16 gage staples, 1″ crown		
Floor			
21. Joist to sill, top plate, or girder	4-8d box (2 1/2″ × 0.113″); or 3-8d common (2 1/2″ × 0.131″); or floor 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, 7/16″ crown	Toenail	
22. Rim joist, band joist, or blocking to top plate, sill or other framing below	8d box (2 1/2″ × 0.113″)	4″ o.c., toenail	
	8d common (2 1/2″ × 0.131″); or 10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, 7/16″ crown	6″ o.c., toenail	
23. 1″ × 6″ subfloor or less to each joist	3-8d box (2 1/2″ × 0.113″); or 2-8d common (2 1/2″ × 0.131″); or 3-10d box (3″ × 0.128″); or 2-1 3/4″ 16 gage staples, 1″ crown	Face nail	
24. 2″ subfloor to joist or girder	3-16d box (3 1/2″ × 0.135″); or 2-16d common (3 1/2″ × 0.162″)	Blind and face nail	
25. 2″ planks (plank & beam - floor & roof)	3-16d box (3 1/2″ × 0.135″); or 2-16d common (3 1/2″ × 0.162″)	Each bearing, face nail	
26. Built-up girders and beams, 2″ lumber layers	20d common (4″ × 0.192″)	32″ o.c., face nail at top and bottom staggered on opposite sides	
	10d box (3″ × 0.128″); or 3″ × 0.131″ nails; or 3″ 14 gage staples, 7/16″ crown	24″ o.c. face nail at top and bottom staggered on opposite sides	
	And: 2-20d common (4″ × 0.192″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails; or 3-3″ 14 gage staples, 7/16″ crown	Ends and at each splice, face nail	
27. Ledger strip supporting joists or rafters	3-16d common (3 1/2″ × 0.162″); or 4-16d box (3 1/2″ × 0.135″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, 7/16″ crown	Each joist or rafter, face nail	
28. Joist to band joist or rim joist	3-16d common (3 1/2″ × 0.162″); or 4-10d box (3″ × 0.128″); or 4-3″ × 0.131″ nails; or 4-3″ 14 gage staples, 7/16″ crown	End nail	
29. Bridging or blocking to joist, rafter or truss	2-8d common (2 1/2″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2-3″ × 0.131″ nails; or 2-3″ 14 gage staples, 7/16″ crown	Each end, toenail	
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
30. 3/8″ - 1/2″	6d common or deformed (2″ × 0.113″); or 2 3/8″ × 0.113″ nail (subfloor and wall)	6	12
	8d common or deformed (2 1/2″ × 0.131″× 0.281″ head) (roof) or RSRS-01 (2 3/8″ × 0.113″) nail (roof)[d]	6[e]	6[e]
	1 3/4″ 16 gage staple, 7/16″ crown (subfloor and wall)	4	8
	2 3/8″ × 0.113″× 0.266″ head nail (roof)	3[f]	3[f]
1 3/4″ 16 gage staple, 7/16″ crown (roof)	3[f]	3[f]	
31. 19/32″ - 3/4″	8d common (2 1/2″ × 0.131″); or deformed (2″ × 0.113″) (subfloor and wall)	6	12
	8d common or deformed (2 1/2″ × 0.131″ × 0.281″ head) (roof) or RSRS-01 (2 3/8″ × 0.113″) nail (roof)[d]	6[e]	6[e]
	2 3/8″ × 0.113″× 0.266″ head nail; or 2″ 16 gage staple, 7/16″ crown	4	8
32. 7/8″ - 1 1/4″	10d common (3″ × 0.148″); or deformed (2 1/2″ × 0.131″ × 0.281″ head)	6	12
Other exterior wall sheathing			
DESCRIPTION OF BUILDING ELEMENTS	**NUMBER AND TYPE OF FASTENER**	**SPACING AND LOCATION**	

33. 1/2″ fiberboard sheathing[b]	1 1/2″ × 0.120″, galvanized roofing nail (7/16″ head diameter); or 1 1/4″ 16 gage staple with 7/16″ or 1″ crown	3	6
34. 25/32″ fiberboard sheathing[b]	1 3/4″ × 0.120″ galvanized roofing nail (7/16″ diameter head); or 1 1/2″ 16 gage staple with 7/16″ or 1″ crown	3	6
Wood structural panels, combination subfloor underlayment to framing			
35. 3/4″ and less	8d common (2 1/2″ × 0.131″); or deformed (2″ × 0.113″); or deformed (2″ × 0.120″)	6	12
36. 7/8″ - 1″	8d common (2 1/2″ × 0.131″); or deformed (2 1/2″ × 0.131″); or deformed (2 1/2″ × 0.120″)	6	12
37. 1 1/8″ - 1 1/4″	10d common (3″ × 0.148″); or deformed (2 1/2″ × 0.131″); or deformed (2 1/2" × 0.120")	6	12
Panel siding to framing			
38. 1/2″ or less	6d corrosion-resistant siding (1 7/8″ × 0.106″); or 6d corrosion-resistant casing (2″ × 0.099″)	6	12
39. 5/8″	8d corrosion-resistant siding (2 3/8″ × 0.128″); or 8d corrosion-resistant casing (2 1/2″ × 0.113″)	6	12
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
Interior paneling			
40. 1/4″	4d casing (1 1/2″ × 0.080″); or 4d finish (1 1/2″ × 0.072″)	6	12
41. 3/8″	6d casing (2″ × 0.099″); or 6d finish (2″ × 0.092″) (Panel supports at 24 inches)	6	12

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ~~ultimate design~~ basic wind speed, V, is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ~~ultimate design~~ basic wind speed, V, is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS.

f. Fastening is only permitted where the ~~ultimate design~~ basic wind speed, V, is less than or equal to 110 mph.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

TABLE 2308.7.5 REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

NOMINAL ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} [i]	ROOF SPAN (feet)							OVERHANGS (pounds/feet)[d]
	12	20	24	28	32	36	40	
85	-72	-120	-145	-169	-193	-217	-241	-38.55
90	-91	-151	-181	-212	-242	-272	-302	-43.22
100	-131	-281	-262	-305	-349	-393	-436	-53.36
110	-175	-292	-351	-409	-467	-526	-584	-64.56

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = ~~1.61 km/hr~~

0.447 meters per second, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 30-foot mean roof height located in Exposure B. For Exposure C or D and for other mean roof heights, multiply the loads by the following adjustment coefficients:

	Mean Roof Height (feet)									
EXPOSURE	15	20	25	30	35	40	45	50	55	60
B	1.00	1.00	1.00	1.00	1.05	1.09	1.12	1.16	1.19	1.22
C	1.21	1.29	1.35	1.40	1.45	1.49	1.53	1.56	1.59	1.62
D	1.47	1.55	1.61	1.66	1.70	1.74	1.78	1.81	1.84	1.87

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements do not account for the effects of overhangs. The magnitude of the loads shall be increased by adding the overhang loads found in the table. The overhang loads are based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

e. The uplift connection requirements are based on wind loading on end zones as defined in Figure 28.5-1 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.7 and multiplying the overhang load by 0.8.

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).

g. Interpolation is permitted for intermediate values of V_{asd} and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.

i. V_{asd} shall be determined in accordance with Section 1609.3.1.

2404.1 Vertical glass. Glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* due to basic ~~design~~ *wind speed*, *V*, in Section 1609 for components and cladding. Glass in glazed curtain walls, glazed storefronts and glazed partitions shall meet the seismic requirements of ASCE 7, Section 13.5.9. The load resistance of glass under uniform *load* shall be determined in accordance with ASTM E1300.
The design of vertical glazing shall be based on Equation 24-1.

$$0.6F_{gw} \le F_{ga} \quad \textbf{(Equation 24-1)}$$

where:

F_{gw} = Wind *load* on the glass due to basic ~~design~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ga} = Short duration *load* on the glass as determined in accordance with ASTM E1300.

2404.2 Sloped glass. Glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, *sunrooms*, sloped roofs and other exterior applications shall be designed to resist the most critical combinations of loads determined by Equations 24-2, 24-3 and 24-4.

$$F_g = 0.6W_o - D \quad \textbf{(Equation 24-2)}$$

$$F_g = 0.6W_i + D + 0.5\,S \quad \textbf{(Equation 24-3)}$$

$$F_g = 0.3\,W_i + D + S \quad \textbf{(Equation 24-4)}$$

where:

D = Glass *dead load* psf (kN/m^2).

For glass sloped 30 degrees (0.52 rad) or less from horizontal,

= 13 t_g (For SI: 0.0245 t_g).

For glass sloped more than 30 degrees (0.52 rad) from horizontal,

= 13 t_g cos θ (For SI: 0.0245 t_g cos θ).

F_g = Total *load*, psf (kN/m^2) on glass.

S = Snow *load*, psf (kN/m^2) as determined in Section 1608.

t_g = Total glass thickness, inches (mm) of glass panes and plies.

W_i = Inward wind force, psf (kN/m^2) due to basic ~~design~~ *wind speed*, *V*, as calculated in Section 1609.

W_o = Outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, *V*, as calculated in Section 1609.

θ = Angle of slope from horizontal.

Exception: The performance grade rating of *unit skylights* and *tubular daylighting devices* shall be determined in accordance with Section 2405.5.

The design of sloped glazing shall be based on Equation 24-5.

$$F_g \leq F_{ga}$$ **(Equation 24-5)**

where:

F_g = Total *load* on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ga} = Short duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equations 24-2 and 24-3; or the long duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equation 24-4.

2404.3.1 Vertical wired glass. Wired glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to the following equation:

$$0.6F_{gw} < 0.5\,F_{ge}$$ **(Equation 24-6)**

where:

F_{gw} = Wind *load* on the glass due to basic ~~design~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* from ASTM E1300 using a thickness designation for monolithic glass that is not greater than the thickness of wired glass.

2404.3.3 Vertical patterned glass. Patterned glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to Equation 24-9.

$$F_{gw} < 1.0\,F_{ge}$$ **(Equation 24-9)**

where:

F_{gw} = Wind *load* on the glass due to basic ~~design~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* in accordance with ASTM E1300. The value for patterned glass shall be based on the thinnest part of the glass. Interpolation between nonfactored *load* charts in ASTM E1300 shall be permitted.

2404.3.5 Vertical sandblasted glass. Sandblasted glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors, and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to Equation 24-12.

$$0.6F_{gw} < 0.5\,F_{ge}$$ **(Equation 24-12)**

where:

F_g = Wind *load* on the glass due to basic ~~design~~ *wind speed*, *V*, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* in accordance with ASTM E1300. The value for sandblasted glass is for moderate levels of sandblasting.

2405.5.2 Skylights rated for separate performance grades for positive and negative design pressure. The design of skylights rated for performance grade for both positive and negative design pressures shall be based on Equations 24-14 and 24-15.

$$F_{gi} \leq PG_{Pos}$$ **(Equation 24-**

$F_{go} \leq PG_{Neg}$ **(Equation 24-14)**

where: **(Equation 24-15)**

PG_{Pos} = Performance grade rating of the skylight under positive design pressure;

PG_{Neg} = Performance grade rating of the skylight under negative design pressure; and

F_{gi} and F_{go} are determined in accordance with the following:

For

where:

W_o = Outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, V, as calculated in Section 1609.

D = The dead weight of the glazing, psf (kN/m^2) as determined in Section 2404.2 for glass, or by the weight of the plastic, psf (kN/m^2) for plastic glazing.

F_{gi} = Maximum load on the skylight determined from Equations 24-3 and 24-4 in Section 2404.2.

F_{go}= Maximum load on the skylight determined from Equation 24-2.

For 0.6 $W_o < D$,

where:

W_o = The outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, V, as calculated in Section 1609.

D = The dead weight of the glazing, psf (kN/m^2) as determined in Section 2404.2 for glass, or by the weight of the plastic for plastic glazing.

F_{gi} = Maximum load on the skylight determined from Equations 24-2 through 24-4 in Section 2404.2.

F_{go} = 0.

Reason: This is a clarifying proposal to clean up the wording in regard to the basic wind speed referenced in the many sections of the code. This proposal makes the wording consistent with ASCE 7 and other loading standards.
Also, modified the metric conversions used for wind speeds in that the maps are based on miles per hour and the conversion is to meters per second not kilometers per hour.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change will not affect the cost of construction. It's just a cleanup with the language to make consistent with other documents.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2304.6.1 Wood structural panel sheathing. Where *wood structural panel* sheathing is used as the exposed finish on the outside of *exterior walls*, it shall have an exterior exposure durability classification. Where *wood structural panel* sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). *Wood structural panel* sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable ~~allowable stress design~~ basic wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.

Committee Reason: Approved as modified as the proposal updates the terms consistent with ASCE 7. Specifically updating to the term 'basic wind speed'. The modification fixes the terminology consistent with ASCE 7. (Vote: 14-0)

Final Hearing Results

S10-21

Original Proposal

IBC: SECTION 202 (New), 1511.9 (New), 1511.9.1 (New), 1511.9.2 (New), 1511.9.3 (New), 1511.9.4 (New), 1511.9.5 (New), 1511.9.6 (New)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new definition as follows:

RAISED-DECK SYSTEM

.
(For application to Chapter 15 only). A system consisting of decking or pavers supported by pedestals installed over a roof assembly to provide a walking surface.

Add new text as follows:

1511.9 *Raised-deck systems* installed over a *roof assembly*. *Raised-deck systems* installed above a *roof assembly* shall comply with Sections 1511.9.1 through 1511.9.5.

1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by parapet walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The parapet wall or enclosure shall extend above the plane of the top surface of the *raised deck system*.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception: Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not obstruct or block plumbing or mechanical vents, exhaust, or air inlets.

1511.9.2 Fire classification. The *raised-deck system* shall be tested, listed and labeled with a fire classification in accordance with Section 1505. The fire classification of the *raised deck system* shall be not less than the fire classification for the *roof covering* over which it is installed.

Exception: Where the top surface of the raised deck system consists of brick, masonry or concrete materials, a fire classification is not required.

1511.9.3 Pedestals or supports. The pedestals or supports for the *raised deck system* shall be installed in accordance with manufacturer's installation instructions.

1511.9.4 Structural requirements. The *raised-deck system* shall be designed for wind loads in accordance with Chapter 16 and Section 1504.5. The *raised-deck system* shall be designed for seismic loads in accordance with Chapter 16.

1511.9.5 Roof drainage. The *raised-deck system* shall not impede the operation of the roof drainage system as required by Section 1502 and the *International Plumbing Code*.

1511.9.6 Access and Egress. Access to the *raised-deck system* shall be in accordance with Chapter 11 and egress shall be in accordance with Chapter 10.

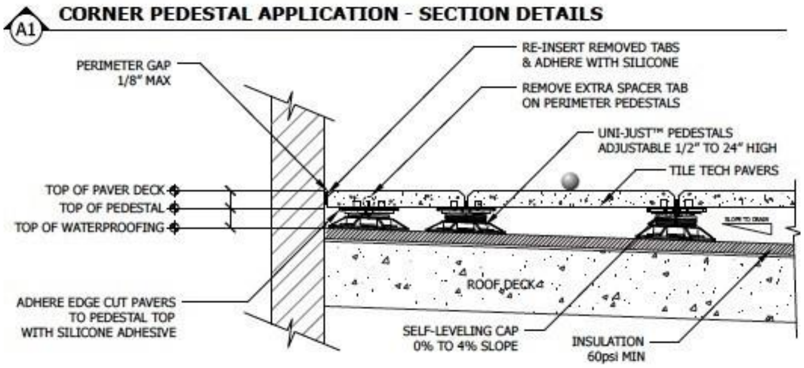
Reason: Currently the IBC does not have any specific provisions for the design and installation of raised-deck systems. These provisions should be a subsection to Section 1511 because these systems are a roof structure over a roof assembly. A definition of “raised deck systems” is needed to ensure correct application of new requirements for these systems. This term is applicable only to Chapter 15 (same “Chapter 15 restriction” as the definition for roof assembly).

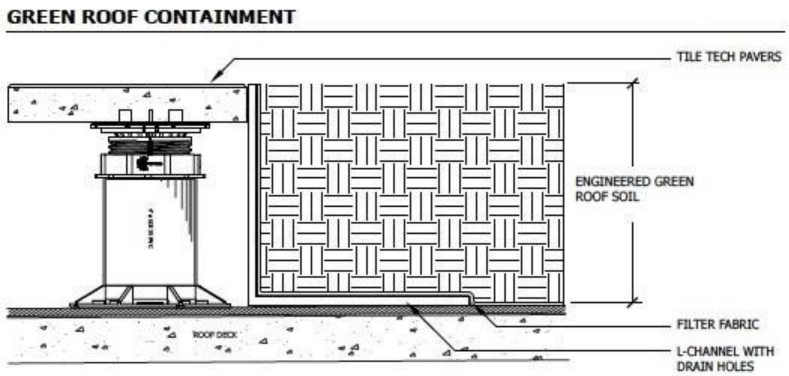
Fire test requirements for the raised deck systems are based on research studies performed for PV panels on low and steep-sloped roofs; which have general applicability to Raised Deck Systems. The following is a link to the reports for those studies: http://www.solarabcs.org/about/publications/reports/flammability-testing/index.html. These studies showed that when fire was able to enter the space between the roof assembly and the panel above, it could significantly alter the original test results for the fire classification of the roof assembly. By providing a protective barrier at the perimeter such as a parapet wall, roof curb or intersection with vegetative roof to prevent fire intrusion into the space, there would not be any concern with affects to the fire classification of the roof assembly underneath.

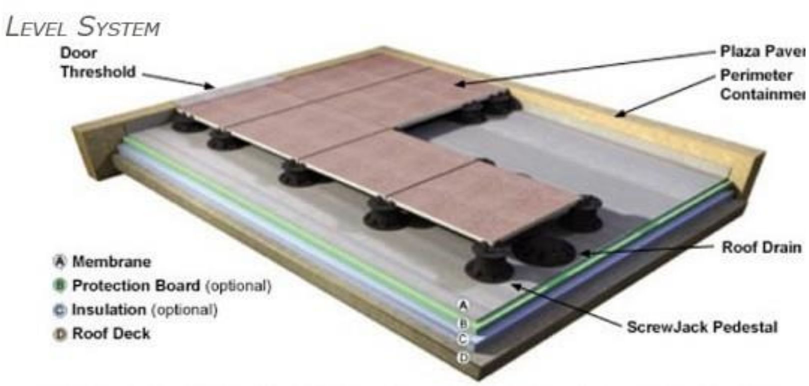
The manufacturer’s installation instructions cover how the pedestals and supports are to be installed for these systems.

Three pointers (code references) for structural; roof water drainage; and access and egress are provided to ensure that these other safety and performance requirements essential for roofs are applied to Raised Deck Systems. The pictures included with this code change illustrate examples of what a typical raised deck system consists of, including a photograph of an actual rooftop pool deck, two cross-sections of a typical raised deck system, and an isometric view of the typical components.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.







Cost Impact: The code change proposal will increase the cost of construction
The code change will increase the cost of construction, for those who decide to install these types of systems. However, this provides clarity on what requirements are to be applied for these installations.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by parapet walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The parapet wall or enclosure shall extend ~~above the plane of~~ at least to the top surface of the *raised deck system*.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception:
   Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.

3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not obstruct or block plumbing or mechanical vents, exhaust, or air inlets.

1511.9.2 Fire classification. The *raised-deck system* shall be ~~tested,~~ listed and ~~labeled~~ identified with a fire classification in accordance with Section 1505 and shall be tested in accordance with either Section 1511.9.2.1 or Section 1511.9.2.2.. ~~The fire classification of the *raised deck system* shall be not less than the fire classification for the *roof covering* over which it is installed.~~

~~**Exception:** Where the top surface of the raised deck system consists of brick, masonry or concrete materials, a fire classification is not required.~~

1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly. The raised deck system shall be tested separately from the roof assembly over which it is installed. The fire classification of the raised deck system shall be not less than the fire classification for the roof assembly over which it is installed.

Exception: Where the top surface of the raised deck system consists of brick, masonry or concrete materials, fire testing of the raised deck system is not required.

1511.9.2.2Fire testing of the raised deck system together with the roof assembly. The roof assembly and the raised deck system shall be tested together.

1511.9.4 Structural requirements. The *raised-deck system* shall be designed for ~~wind~~ all applicable loads in accordance with Chapter 16 and performance requirements in Section 1504.5. T~~he *raised-deck system* shall be designed for seismic loads in accordance with Chapter 16.~~

Committee Reason: The committee determined the modification corrects terminology problems, identified multiple test path methods, and corrects wind and seismic load requirements. The proposal provides design options and reduces the potential hazard. One of the committee members asked the proponent to address the following in the public comment phase:
1) Identify parapet.
2) Section 1511.9.5 needs to address the snow accumulation issue.
3) Section 1511.9.1, #4 needs to address obstruction of roof drainage.
4) Section 1511.9.2 exception could include a material standard for thickness.
5) Section 1511.9.3 needs to address the load distribution of the intersect between roof membrane with foam plastic underneath.
6) Consider the dead load of this system on the roof structure.
For the group B hearing, one of the committee members suggested that the proponent consider introducing more details for Ballasted photovoltaic panel systems. The only reference for those systems is in section 1607.14.4.5, Ballasted photovoltaic panel systems).(Vote: 12-1)

Public Comments

Public Comment 1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1511.9.1 Installation . The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by ~~parapet~~ walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The ~~parapet~~ wall or enclosure shall extend at least from the roof assembly to the top surface of the *raised deck system*. The enclosure shall not impede roof drainage in accordance with Section 1511.9.5.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception: Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not ~~obstruct or block~~ impede the operation of plumbing or mechanical vents, exhaust, ~~or~~ air inlets, or roof drains. Where required, access for inspection, cleaning or maintenance shall be provided.

1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly . The raised deck system shall be tested separately from the roof assembly over which it is installed. The fire classification of the raised deck system shall be not less than the fire classification for the roof assembly over which it is installed.

Exception: Where the ~~top surface~~ decking or pavers of the raised deck system consists of brick, masonry, ~~or~~ concrete ~~materials~~, or other noncombustible materials, fire testing of the raised deck system is not required.

1511.9.5 Roof drainage . The raised-deck system, including the wall or enclosure between the roof assembly and the raised deck, shall be designed and installed to ~~not impede~~ allow for the operation of the roof drainage system as required by Section 1502 and the International Plumbing Code. The roof structure shall be designed to support any standing water resulting from the installation of the raised-deck system.

1511.9.6 ~~Access~~ Accessibility and Egress . ~~Access to the the~~ The raised-deck system shall be accessible in accordance with Chapter 11 and means of egress shall be provided in accordance with Chapter 10.

Commenter's Reason: This Public Comment is in response to the request from the Code Development Committee (CDC) to further refine the proposed new section for raised deck systems. The BCAC worked with the CDC member to make sure the specific concerns were properly addressed.
Fundamentally, the concerns were to clarify necessary roof drainage and roof structure support, while not adversely impacting fire safety, which were specifically addressed as follows:

1) Identify parapet. – The term "parapet" is proposed to be removed from Section 1511.9.1. This action re-focuses the purpose of the enclosure surrounding the raised deck system. The "enclosure" is intended to serve as a flame "shield" to prevent flame propagation underneath the raised deck.

2) Section 1511.9.5 needs to address the snow accumulation issue. – Snow accumulation varies depending on the location. Proposed change requires the registered design professional and the installer to appropriately design and install to address for local conditions to ensure roof drainage. The design shall consider water migration through the deck system and for water flow to drains from other portions of the roof.

3) Section 1511.9.1, #4 needs to address obstruction of roof drainage. – Roof drains have been added to the list of what shall not be obstructed. Requirement for access to be provided for inspection, cleaning, and maintenance have been added to provide suitable means to address any field issues.

4) Section 1511.9.2 exception could include a material standard for thickness. – The concern raised was to address the potential of a thin superstrate of noncombustible material, backed with combustible material, being accepted without appropriate fire testing. Instead of specifying a thickness of the top surface, where decking or pavers are noncombustible, the system is not required to be fire tested, even in those situations where the support structure underneath utilizes combustible materials.

5) Section 1511.9.3 needs to address the load distribution of the intersect between roof membrane with foam plastic underneath. – This is addressed through both the manufacturer's installation instructions, and also the requirements in Section 1511.9.4 for addressing all structural loading.

6) Consider the dead load of this system on the roof structure. – The floor modification at the Code Action Hearing (Thai 12), which was part of the modifications approved by the Committee addressed this in Section 1511.9.4 already.

Additional editorial cleanup is proposed for Section 1511.9.6 for clarification and consistency with G1-21.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The code change will increase the cost of construction, for those who decide to install these types of systems. However, this provides clarity on what requirements are to be applied for these installations.

Final Hearing Results

S10-21	AMPC1

S11-22

Original Proposal

IBC: 1504.7

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Delete without substitution:

~~**1504.7 Physical properties.** *Roof coverings* installed on low-slope roofs (roof slope < 2:12) in accordance with Section 1507 shall demonstrate physical integrity over the working life of the roof based on 2,000 hours of exposure to accelerated weathering tests conducted in accordance with ASTM G152, ASTM G154 or ASTM G155. Those *roof coverings* that are subject to cyclical flexural response due to wind *loads* shall not demonstrate any significant loss of tensile strength for unreinforced membranes or breaking strength for reinforced membranes when tested as herein required.~~

Reason: This code change proposal is intended to clarify the code's intent by removing Section 1504.7-Physical Properties, which requires accelerated weathering for roof coverings used on low-slope roofs (roof slope < 2:12) to demonstrate no significant loss of tensile strength or breaking strength. The code's requirement does not specifically define "significant loss" levels. As a result, this requirement is difficult to interpret and enforce.

Section 1506.2 already requires roofing products to confirm to the applicable product standards prescribed in the code. Section 1507-Requirements for Roof Coverings defines the specific standards the products and materials. Such product standards include accelerated aging and weathering testing, and specific pass/fail criteria deemed appropriate by the standard developer for the products. For example, the product standard for TPO single-ply roof membranes, ASTM D6878, "Standard Specification for Thermoplastic Polyolefin-based Sheet Roofing," includes not only accelerated weathering resistance testing with no resulting cracks or crazing, but also ozone resistance testing (no cracks) and retention of physical properties after heat aging (max. 1.5% weight loss and no cracking when bent over a mandrel). Such testing is more severe than that currently in Section 1504.7.

Removing Section 1504.7 and relying on the testing included in the product standards already included in Section 1507 will not decrease the performance levels of roof coverings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal has no cost impact. It does not lower or raise performance levels already incorporated in the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this proposal clarifies the code's intent by removing Section 1504.7, which required accelerated weathering for roof coverings used on low-slope roofs to demonstrate no significant loss of tensile strength or breaking strength. The existing code requirement does not specifically define 'significant loss' levels, as a result, this requirement was difficult to interpret and enforce. (Vote: 14-0)

Final Hearing Results

S11-22	AS

S12-22

Original Proposal

IBC: TABLE 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[e] ~~[d]~~								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. <u>The tabulated values apply only to conditions where the topographic factor (K_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} is incorporated in the mapped basic design wind speed in section 1609</u>.

e. ~~d.~~ For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason: This proposal is needed because Table 1504.9 does not indicate that the tabulated values are based on the absence of topographic effects at the building site. Consequently, the tabulated values could be inappropriately interpreted as applying to sites where topographic effects exist (e.g., $K_{zt} > 1.0$). This could result in increased wind speed at roof height and result in a more severe condition for aggregate blow-off than considered in developing the table based on the assumption of $K_{zt} = 1.0$. This concern does not apply where topographic wind speed-up effects are incorporated into the wind map for Hawaii [2021 IBC Figures 1609.3(5) through 1609.3(12)].

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change technical content. It adds documentation about an existing limitation associated with Table 1504.9. There should be no change in cost of construction if this proposal is approved.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[e]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. The tabulated values apply only to conditions where the topographic factor (K_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} is incorporated in the ~~mapped~~ basic ~~design~~ wind speed in section 1609.

e. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Committee Reason: Approved as modified as the proposal correctly updates the language used in Table 1504.9 and clarifies that the Table applies to only sites with no topography. The committee did request for coordination with parapets as a public comment. The modification updates the terminology consistent with ASCE 7. (Vote: 14-0)

Final Hearing Results

S12-22 AM

S13-22

Original Proposal

IBC: 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. <u>Such parapets shall be provided on the perimeter of the roof at all exterior sides except where an adjacent wall extends above the roof to a height at least equivalent to that required for the parapet.</u>

Reason: The additional sentence clarifies treatment of the Table 1504.9 requirements for the special circumstance in which a building roof has at least one side bounded by a wall.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Existing language implies a parapet is required on all roof sides. This change makes that implied requirement explicit and addresses potential confusion in interpretation of Section 1504.9. Because it improves understanding of existing provisions without creating new requirements, no change in cost of construction is associated with this proposal.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. Some committee members were concerned with the use of 'adjacent' vs. possibly using 'adjoining' in section 1504.9. (Vote: 8-6)

Final Hearing Results

S13-22	AS

S14-22

Original Proposal

IBC: 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. For roofs with differing surface elevations due to slope or sections at different elevations, the minimum parapet height shall be provided for each roof surface elevation and at no point shall the parapet height be less than that required by Table 1504.9.

Reason: The additional sentence clarifies treatment of the Table 1504.9 requirements with respect to both roof slope and the special circumstance in which a building has roof sections at different elevations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The additional sentence in this proposal makes explicit what is already implied in Section 1504.9 without creating a new requirement. The improved understanding of existing provisions should not alter cost of construction if this proposal is approved.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. For roofs with differing surface elevations due to slope or sections at different elevations, the minimum parapet height shall be ~~provided for~~ determined based on each roof surface elevation, and at no point shall the parapet height be less than that required by Table 1504.9.

Committee Reason: Approved as modified per the provided reason statement. The modification clarifies the language. (Vote:14-0)

Final Hearing Results

S14-22	AM

S15-22

Original Proposal

IBC: TABLE 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[d]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for wind speed, mean roof height and parapet height. Extrapolation is not permitted.

b. Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason: This proposal clarifies that interpolation is permissible for wind speed in addition to mean roof height and parapet height. It further clarifies that extrapolation beyond the limits of the table is not permitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The modifications to the footnote provide additional explanatory information without making any technical change. No change in cost of construction is expected if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies the use of Table 1504.9. (Vote: 14-0)

Final Hearing Results

S15-22	AS

S16-22

Original Proposal

IBC: TABLE 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c , d]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[ed]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Parapet height is measured vertically from the top surface of the coping down to the surface of the*roof covering* in the field of the roof adjacent to the parapet and outbound of any cant strip.

b.~~a.~~ Interpolation shall be permitted for mean roof height and parapet height.

c.~~b.~~ Basic design wind speed, *V*, and wind exposure shall be determined in accordance with Section 1609.

d.~~c.~~ Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

e.~~d.~~ For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason: The proposal provides necessary direction for measurement of the parapet height.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new footnote provides guidance for measurement of the parapet height. A few users may obtain lower parapet heights and a few may obtain higher heights if their measurement technique differs substantially from this provision, causing some to experience decreases in cost of construction and some to experience increases. The number of cases where a different height is obtained is likely to be very small, and there is no basis to believe a systematic bias exists between existing measurement techniques and the guidance provided in this proposal. Therefore, no general increase in cost of construction is anticipated.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies how parapet height is to be measured. (Vote: 14-0)

Final Hearing Results

S16-22	AS

S17-22

Original Proposal

IBC: 1504.9

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

Exception: Aggregate ballasted single-ply roof coverings shall be designed and installed accordance with Section 1504.5.

Reason: This code change proposal is intended to add clarity to the code by adding an exception to Section 1504.9 indicating aggregate ballasted single-ply membrane roofs are already addressed by the requirements in Section 1504.5. No changes are intended to the code's requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is simply a clarification of the code's existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

Exception: ~~Aggregate ballasted~~ Ballasted single-ply roof coverings shall be designed and installed accordance with Section 1504.5.

Committee Reason: Approved as modified per the provided reason statement. The modification adjusts the terminology for clarity. (Vote: 14-0)

Final Hearing Results

S17-22	AM

S18-22

Original Proposal

IBC: [BF] 1505.8, SECTION 202

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

[BF] 1505.8 Building-integrated photovoltaic (BIPV) ~~products~~ systems. *BIPV ~~products~~* systems installed as the roof covering shall be tested, *listed* and *labeled* for fire classification in accordance with Section 1505.1.

[BS] BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ~~PRODUCT~~ SYSTEM. A building ~~product~~ system that incorporates *photovoltaic modules* and functions as ~~a~~ an integral part ~~component~~ of the building envelope, such as *roof assemblies* and *roof coverings*, *exterior wall envelopes* and *exterior wall coverings*, and *fenestration*.

Reason: The term “BIPV product” is used twice in the I-codes, both requiring fire classification for roofing applications (IBC Section 1505.8 and IRC Section R902.3). The term “BIPV system” is used eight times in the I-codes, addressing roof access, rapid shutdown systems, and fire classification for roofing applications (IFC Sections 1205.2 and 1205.2.3; IBC Sections 3111.3.2 and 3113.3; and IRC Sections R324.5, R324.5.2, R324.6 and R324.6.3). IBC Section 3111.3.2 directs BIPV systems to have a fire classification in accordance with Section 1505.8.

The word “system” is defined by the dictionary as “a combination of things or parts forming a complex or unitary whole”, whereas the word “product” is defined as “the totality of goods or services that a company makes available; something produced”. “Product” infers a discrete piece, whereas “system” better describes a number of components that when installed function together for a specific purpose. This proposal also clarifies that these systems, when installed per the manufacturer’s installation instructions, become an integral part of the building envelope to provide a physical separator between internal and external environments.The types of BIPV systems that include “e*xterior wall envelopes* and *exterior wall coverings*, and *fenestration*” are added because FS150-21 in Group A added these types of BIPV systems to Chapter 14 of the IBC.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the term as it is used throughout the family of ICC codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies the definitions consistent with the IRC code committee actions. The committee did note that in the definition of 'Building-integrated photovoltaic (BIPV) system' the phrase 'integral part' could be confusing. (Vote: 11-3).

Final Hearing Results	
S18-22	AS

S19-22

Original Proposal

IBC: 1507.1.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer modified bitumen underlayment complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed shall be permitted.

2. ~~1.~~ As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.

3. ~~2.~~ As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.

4. ~~3.~~ Structural metal panels that do not require a substrate or underlayment.

Reason: This proposal adds back into the IBC an exception permitting underlayment complying with ASTM D1970 that was removed during the previous code development cycle. Proposal S24-19 struck the existing exception and cited the mention of D1970 in 1507.1.1 as justification. Section 1507.1.1 states that D1970 underlayment must bear a label and refers to Tables 1507.1.1(1), 1507.1.1(2), and 1507.1.1(3). However, D1970 is not included in those tables, which is the reason this exception is necessary. In addition, the exception is needed to maintain some of the specific criteria for the use of this underlayment such as roof ventilation and climate exposure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects an error by reinserting a section that should not have been removed. By doing so, it expands available underlayment options for all roof covering types that use underlayment. The cost of construction impact will be project specific and might lead to decrease or increase. When considered across many projects, cost impact of approving this proposal is expected to be neutral.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adds a needed exception which adds flexibility to the options for an underlayment. (Vote: 13-1)

Final Hearing Results

S19-22	AS

S20-22

Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3)

Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.

~~1.~~ 2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane bearing a label indicating compliance to ~~complying with~~ ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering and design wind speed ~~for design wind speeds less than 120 mph (54 m/s~~) shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table 1507.1.1(2) using the application requirements for where the maximum basic design wind speed is less than 130 mph. Underlayment shall be attached in accordance with Table 1507.1.1(3) for the applicable roof covering and design wind speed.

~~2.~~ ~~As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19.1 mm) into the roof sheathing.~~

~~3.~~ Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V <130 140 MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, V ≥130 140 MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D6757

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V <130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, V ≥130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type I~~ ~~ASTM D6380 Class M mineral surfaced roll roofing~~
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or IV ~~ASTM D6757~~

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.
Clay and concrete tile	1507.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up ~~to 4 units vertical in 12 units horizontal (4:12),~~ underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. ~~For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.~~
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 130 140 MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 130 140 MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diametermetal or plastic caps nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nail.sStaples shall be not less than 21 gage (0.032 inch). The cap nail shankand cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diametermetal or plastic caps nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shankand cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

Reason: This code change will align the IBC roof underlayment requirements in high wind regions with the 2021 IRC. For practical purposes, this code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2021 IBC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where the design wind speed is 130 mph and greater for consistency with the 2021 IRC. This wind speed would capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for special wind regions and Alaska, the trigger remains the same consistent with the IRC.

Water infiltration due to wind driven rain has been well documented from post-hurricane damage assessments where hurricane winds were strong enough to blow off the primary roof covering, but not strong enough to blow off roof sheathing. In such instances, significant property damage and extended occupant displacement routinely occur due to water intrusion. In many cases, the building will appear relatively undamaged from the exterior except for roof covering loss. However, a closer inspection would reveal significant interior and contents damage.

Water entry can occur where it is able to infiltrate through the roof, walls, vents, windows, and/or doors, or at interfaces between these items. Water intrusion can cause extensive damage to interior finishes, furnishings, and other contents, and can lead to ceiling collapse when attic insulation is saturated. When power is lost and/or a building cannot otherwise be dried out within 24-48 hours, additional issues such as mold can develop, potentially extending the period during which the property may not be available for use. Recent hurricanes have not been an exception.

Tests performed by IBHS at the Research Center have consistently shown that the secondary roof underlayment strategies recommended by the IBHS Fortified Commercial - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. Two of these strategies are already recognized by the code in Exceptions 1 and 2 to Section 1507.1.1. A 2011 hurricane demonstration clearly showed the benefit of sealing the

seams of the roof deck sheathing which is one of the strategies recognized in Exception 1 to Section 1507.1.1.

A summary of the results of the demonstration can be viewed at the following link:

http://ibhstest.wpengine.com/ibhsnews-releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

The wind driven rain demonstration can be viewed at the following

https://disastersafety.org/thunderstorms/winddriven-rain-demo/.

A more recent study included an assessment of a new approach where the roof is covered with two layers of high-quality underlayment attached with cap nails. Based on the performance achieved with this system, it has now been added to the FORTIFIED program as a fifth option for achieving a sealed roof deck. This report is identified in the bibliography and has been included as an attachment to this code change. All of the underlayment strategies, including the two layers of felt underlayment reduced water entry into the attic space by 70% or more.

This proposal also adds one the most effective methods for preventing water intrusion back into the code. The use of fully adhered underlayment complying with ASTM D1970 has been recognized in the IBC going back to the mid-2000's. S24-19 deleted this exception permitting the use of ASTM D1970 underlayment on basis of it being redundant as it was listed in Section 1507.1.1. However, Section 1507.1.1 doesn't specifically permit this type of underlayment other than it is required to comply with the listed standard. A similar proposal for the IRC was proposed but a public comment added the exception for fully adhered underlayment back in. This proposal adds the exception for fully adhered underlayment complying with ASTM D 1970 back in the code consistent with the 2021 IRC.

Bibliography: Brown, T.M., Quarles, S.L., Giammanco, I.M., Brown, R., Insurance Institute for Business and Home Safety, "Building Vulnerability to Wind-Driven Rain Entry and Effectiveness of Mitigation Techniques." 14th International Conference on Wind Engineering (ICWE).

Cost Impact: The code change proposal will increase the cost of construction
If one of the methods in Exceptions 1 or 2 of Section 1507.1.1 are used, this proposal will not increase the cost of construction.

If the double layer of underlayment option is used, for areas where design wind speeds are greater than or equal to 130 mph in the Hurricane-Prone Region (140 mph elsewhere), the cost of the additional layer of underlayment will vary by region. However, for a 2000 square foot roof, the cost increase for the additional layer of underlayment will be between $100 to $200. For areas where the design wind speed is less than 140 mph but equal to or greater than 130 mph in the Hurricane-Prone region, additional fasteners will be required in addition to the additional layer of underlayment.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).
Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.

2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane bearing a label indicating compliance to ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering and ~~design~~ basic wind speed shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table 1507.1.1(2) using the application requirements for where the maximum basic ~~design~~ wind speed is less than 130 mph. Underlayment shall be attached in accordance with Table 1507.1.1(3) for the applicable roof covering and ~~design~~ basic wind speed.
3. Structural metal panels that do not require a substrate or underlayment.

Committee Reason: Approved as modified as this proposal aligns the IBC roof underlayment requirements in high wind regions with the 2021 IRC. The modification updates the terminology consistent with ASCE 7. (Vote:12-1)

Final Hearing Results

S20-22	AM

S21-22

Original Proposal

IBC: SECTION 202, SECTION 202 (New), 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), 1507.16, 1507.16.1, 1507.16.2, 1507.16.3, 1507.16.4, 1507.16.5, 1507.16.6, 1507.16.7, 1507.16.8

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

[BS] ~~**PHOTOVOLTAIC SHINGLES.** A *roof covering* resembling shingles that incorporates*photovoltaic modules*.~~

Add new definition as follows:

<u>**BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING.** A *BIPV system* that also functions as a *roof covering*. Coverings include, but not limited to, shingles, tiles, and roof panels.</u>

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and ~~*photovoltaic shingles*~~ <u>*BIPV roof coverings*</u> shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Clay and concrete tile	1507.3	For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. **MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH**
Clay and concrete tile	1507.3		
Photovoltaic shingles BIPV roof coverings	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

1507.16 ~~Photovoltaic~~ BIPV shingles. The installation of ~~*photovoltaic*~~ *BIPV shingles* shall comply with the provisions of this section.

1507.16.1 Deck requirements. ~~*Photovoltaic*~~ *BIPV shingles* shall be applied to a solid or closely fitted deck, except where the shingles are specifically designed to be applied over spaced sheathing.

1507.16.2 Deck slope. ~~*Photovoltaic*~~ *BIPV shingles* shall be installed on roof slopes of not less than 2 units vertical in 12 units horizontal (2:12).

1507.16.3 Underlayment. *Underlayment* shall comply with Section 1507.1.1.

1507.16.4 Ice barrier. Where required, ice barriers shall comply with Section 1507.1.2.

Revise as follows:

1507.16.5 Fasteners. Fasteners for ~~*photovoltaic*~~ *BIPV shingles* shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12-gage [0.105 inch (2.67 mm)] shank with a minimum $^3/_8$-inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and not less than $^3/_4$ inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than $^3/_4$ inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F1667.

1507.16.6 Material standards. ~~*Photovoltaic*~~ *BIPV shingles* shall be *listed* and labeled in accordance with UL 7103 or with both UL 61730-1 and UL 61730-2.

1507.16.7 Attachment. ~~*Photovoltaic*~~ *BIPV shingles* shall be attached in accordance with the manufacturer's installation instructions.

1507.16.8 Wind resistance. ~~*Photovoltaic*~~ *BIPV shingles* shall comply with the classification requirements of Table 1504.2 for the appropriate maximum nominal design wind speed.

Reason: For the definitions, there are different forms of BIPV roof coverings, just as there are different forms of traditional roof coverings. The code defines roof coverings in general, and the different forms are described in Chapter 15 for their specific application. This change aligns with the change to the definition of BIPV Systems, which clarifies this type of photovoltaic solar energy system.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This provides clarity and consistency in terminology related to BIPV used as roof assemblies and roof coverings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this appropriately updates the terms for BIPV. (Vote:13-1)

Final Hearing Results

S21-22	AS

S22-22 Part I

Original Proposal

IBC: TABLE 1507.1.1(1), 1507.1.1, ASTM Chapter 35 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 <u>ASTM D8257</u>
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing <u>ASTM D8257</u>	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing <u>ASTM D8257</u>
Metal roof panels	1507.4	Manufacturer's instructions <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV <u>ASTM D8257</u>
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV <u>ASTM D8257</u>
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV <u>ASTM D8257</u>
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV <u>ASTM D8257</u>
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV <u>ASTM D8257</u>
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV <u>ASTM D8257</u>
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 <u>ASTM D8257</u>	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 <u>ASTM D8257</u>

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869<u>,</u> ~~and~~ D6757<u> or ASTM D8257</u> shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section 1507.1.1-Underlayment and Table 1507.1.1(1)-Underlayment Types.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds an additional option for roof underlayment. Synthetic underlayment products are priced competitively to the underlayment products already included in the Code.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257
Metal roof panels	1507.4	Manufacturer's instructions ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257

Committee Reason: Approved as modified as the proposal allows appropriate new options for roof underlayment. Per the request of the industry, the modification reverts the table, for wood shingles and wood shakes, back to existing wording. (Vote: 14-0)

Final Hearing Results

S22-22 Part I AM

S22-22 Part II

Original Proposal

IRC: R905.1.1, TABLE R905.1.1(1), ASTM Chapter 44 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile,*metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757 and D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Metal panels	R905.10	Manufacturer's instructions ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D4869 Type III or Type IV ASTM D8257

For SI: 1 mile per hour = 0.447 m/s.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section R905.1.1-Underlayment and Table R905.1.1(1)-Underlayment Types.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds an additional option for roof underlayment. Synthetic underlayment products are priced competitively to the underlayment products already included in the Code

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Modification: TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257

Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D8257~~
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D8257~~
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D4869 Type III or Type IV ASTM D8257

Committee Reason: Due to compliance issues, the committee decided that the modification corrects the proposal by deleting ASTM D8257 from wood shingles and wood shakes in Table R905.1.1(1). In addition, the committee determined that the proposal, as modified, added a new ASTM standard in Table R905.1.1(1) for mechanically attached polymeric roof underlayment used in steep slope roofing to be used and eliminate confusion. Finally, the committee asked the proponent to clarify the use of "and " "or" to avoid any confusion (Vote: 9-0).

Final Hearing Results

S22-22 Part II	AM

S23-22

Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757,D2626 Type I or D6380 Class M shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II, ~~or~~ ASTM D4869 Type IV or ASTM D6757 shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels applied to a solid or closedly fitted deck	1507.4	Manufacturer's instructions ASTM D226 Type I or II ASTM D4869, Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes applied to a solid sheathing roof deck	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV

Reason: This code change proposal is a clarification and clean-up of Table 1507.1.1(1). Specifically:

- In Section 1507.1.1, ASTM D2626, Type I and ASTM D6380, Class M are added since these already occur in the table.
- In Section 1507.1.1, Exception 2, ASTM D6757 is added since it already appears in the table and is appropriate for a two layer application.

- In the table in the row for clay and concrete tile roof coverings, "mineral surface roof roofing" is deleted from the description of ASTM D6380, Class M as it is unnecessary. The Class M designation already identifies the product as being mineral granule-surfacing.
- In the table in the row for metal roof panel roof coverings, underlayment is only used over solid or closely fitted decks. Where a structural metal panel roof covering is applied over open framing without a roof deck, an underlayment is not applied. Also, "Manufacturer's instructions" is stuck from the cell for maximum basic wind design wind speed, V < 140 mph. This is replaced with ASTM designation underlayment standards similar to what is already appearing in the rows for Clay and Concrete Roof Tiles through Wood Shakes.
- In the table for the row for wood shake roof coverings, underlayment is only used over solid roof deck sheathing. Where a wood shake roof covering is applied over spaced sheathing, an underlayment is not applied to allow for downward venting/drying of the wood shakes. An interlayment is unused between courses of wood shakes per Section 1507.9.6

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification and clean-up of the table.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

Portions of table not shown remain unchanged.

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M
Metal roof panels applied to a solid or closely fitted deck	1507.4	ASTM D226 Type I or II ASTM D4869, Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes applied to a solid sheathing roof deck	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757,D2626 ~~Type I~~ or D6380 Class M shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.

2. As an alternative, two layers of underlayment complying with ASTM D226 Type II, ASTM D4869 Type IV or ASTM D6757 shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

Committee Reason: Approved as modified as per the provided reason statement. The modification corrects the table as ASTM D2626 does not have types. (Vote: 14-0)

Final Hearing Results	
S23-22	AM

S24-22 Part I

Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), ASTM Chapter 35 (New)

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment in accordance with this section is requiredfor asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757, and D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be ~~attached~~ fastened in accordance with Table 1507.1.1(3).

Exception~~s~~:

~~1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.~~

~~2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.~~

~~3.~~ Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, $V \geq 140$ MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Clay and concrete tile	1507.3	For roof slopes from 2 $^1/_2$ units vertical in 12 units horizontal (2 $^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

TABLE 1507.1.1(3) UNDERLAYMENT ~~ATTACHMENT~~ FASTENING

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The Mechanically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of maximum 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The Mechanically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of maximum 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

For SI: 1 inch = 25.4 mm; 1 mile per hour = 0.447 m/s.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also re-configures the expression of the options for enhanced underlayment systems in high wind areas.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1507.1.1 Underlayment. Underlayment in accordance with this section is required for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757, ~~and~~ or D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be fastened in accordance with Table 1507.1.1(3).

Exception:

Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally,~~ 3. ~~a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	1507.3	Underlayment shall be one of the following: 1. For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally, a~~ 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	Underlayment shall be one of the following: 1. For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally, a~~ 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

Committee Reason: Approved as modified as the proposal clarifies that an underlayment is required and provides updates to the appropriate ASTM's consistent with the actions on S24-22 Part II. Per the request of the industry, the modification reverts the table, for wood shingles and wood shakes, back to existing wording. (Vote: 14-0)

Final Hearing Results

S24-22 Part I AM

S24-22 Part II

Original Proposal

IRC: R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3), ASTM Chapter 44 (New)

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* in accordance with this section is required for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757, and D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be ~~attached~~ fastened in accordance with Table R905.1.1(3).

~~**Exceptions:**~~

1. ~~As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.~~
2. ~~As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering~~

Exception: Structural metal panels that do not require a substrate or underlayment.

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches.~~ Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~a~~Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Clay and concrete tile	R905.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles Mineral-surfaced roll roofing Slate and slate-type shingles Wood shingles Wood shakes Metal panels	R905.4 R905.5 R905.6 R905.7 R905.8 R905.10	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Photovoltaic shingles	R905.16	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(3) UNDERLAYMENT ~~APPLICATION~~ ATTACHMENT

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	~~The~~ Mechnically fastened underlayment shall be~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
Photovoltaic shingles	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	~~The~~ Mechnically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

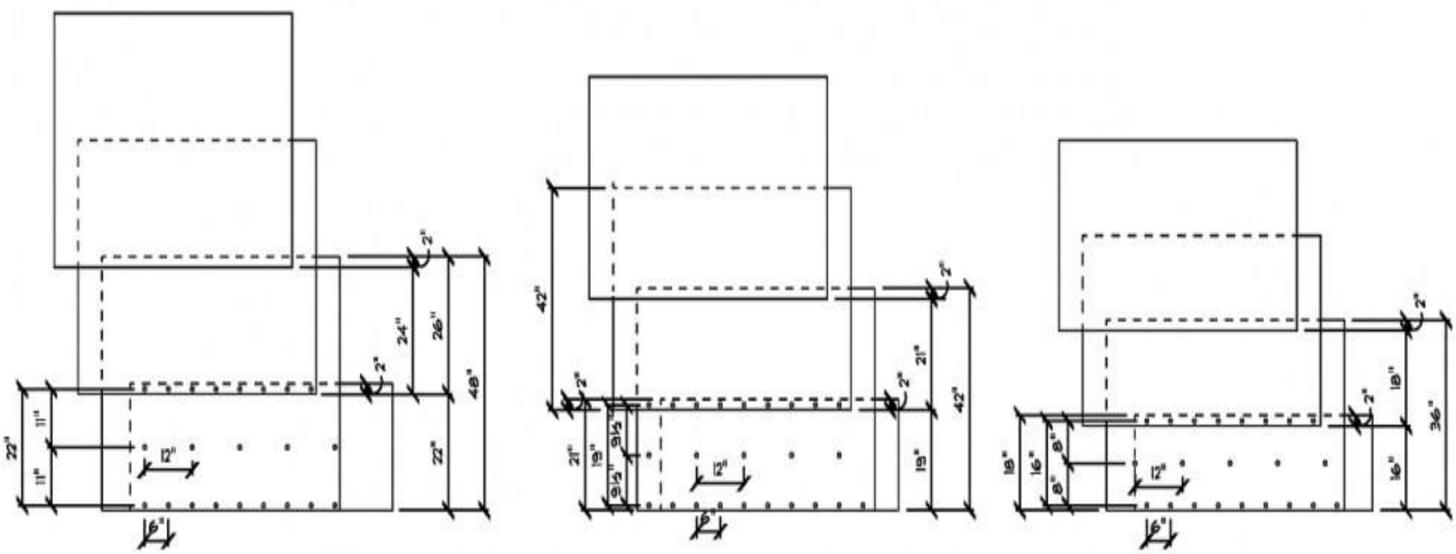
Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system (See below Fig. clarifying the Underlayment Lapping and Fastening) in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also adds an exception in the charging paragraph for consistency with current IBC language, and also includes some cleanup items for clarity and consistency.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

Public Hearing Results

Committee Action **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Reason: The committee decided that the proposed text is confusing, especially in the column for areas where wind design is not required in accordance with figure R301.2.1.1, which could be misunderstood as requiring another layer. Therefore, the committee asked the proponent to clarify the language in the public comment phase (Vote: 8-1).

Public Comments

Public Comment 1

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R905.1.1 Underlayment. *Underlayment* in accordance with this section is required for asphalt shingles, clay and concrete tile,*metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes,*metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter.*Underlayment* materials required to comply with ASTM D226, D1970, D4869, D6757, ~~and~~ or D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2).*Underlayment* shall be fastened in accordance with Table R905.1.1(3).

Exception: Structural metal panels that do not require a substrate or underlayment.

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D8257 ASTM D1970
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D4869 Type III or IV ASTM D8257 ASTM D1970

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. ~~Additionally, a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. ~~Additionally, a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Photovoltaic shingles	R905.16	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. ~~Additionally, a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
Photovoltaic shingles	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Commenter's Reason: This modification satisfies concerns from several industry stakeholders and harmonizes the contents of Section R905.1 with the language that was approved as modified in Proposal S24-22 Part I for the IBC.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This proposal and comment merely provide clarification of the underlayment requirements and adds a new ASTM Standard that applies exclusively to synthetic underlayments.

Final Hearing Results

S24-22 Part II AMPC1

S26-22

Original Proposal

IBC: 1507.2.8

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.2.8 Flashings. Flashing for asphalt shingles shall comply with this section. Flashing shall be applied in accordance with this section and the asphalt shingle manufacturer's ~~printed~~ instructions.

Reason: Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word “printed” from the only instance in IBC Chapter 15 where it is used in conjunction with "instructions." Removal of the word “printed” will permit alternative methods for providing instructions, including digital formats that support greater sustainability. The proposed change is important in light of events such as the COVID-19 pandemic, which brought attention to the need to deliver information using alternative methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal expands available options for delivering manufacturer's instructions, which allows manufacturers to select the option that best serves their customers. There is no basis to expect either a general increase or decrease in cost of construction if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as manufacturer's instructions are not always 'printed'. They can be electronic. (Vote: 13-0)

Final Hearing Results

S26-22	AS

S27-22

Original Proposal

IBC: 1507.2.8.2

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.2.8.2 Valleys. Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 24 inches (610 mm) wide and of any of the corrosion-resistant metals in Table 1507.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing complying with ASTM D3909 or ASTM D6380 shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.
3. For closed valleys (valleys covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380, and not less than 36 inches (914 mm) wide or types as described in Item 1 or 2 above shall be permitted. Self-adhering polymer modified bitumen *underlayment* bearing a label indicating compliance with ASTM D1970<u>and not less than 36 inches (914 mm) wide</u> shall be permitted in lieu of the lining material.

Reason: Although implied, the minimum width of ASTM D1970 valley lining is not provided in the existing language of the IBC. This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal defines an implied requirement to remove ambiguity. No change in cost of construction is expected if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal correctly clarifies the requirements for valleys. (Vote:14-0)

Final Hearing Results

S27-22 AS

S28-22

Original Proposal

IBC: 1507.4.3, TABLE 1507.4.3(1), TABLE 1507.4.3(2), 1507.5.5

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1507.4.3 Material standards. Metal-sheet *roof covering* systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet *roof coverings* installed over structural decking shall comply with Table 1507.4.3~~(1)~~. ~~The materials used for metal-sheet *roof coverings* shall be naturally corrosion resistant or provided with *corrosion resistance* in accordance with the standards and minimum thicknesses shown in Table 1507.4.3(2).~~

TABLE 1507.4.3~~(1)~~ METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
5% Aluminum alloy-coated steel	ASTM A875, GF60
Aluminum	ASTM B209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-coated steel	ASTM A463, T2 65
Aluminum-zinc alloy coated steel	ASTM A792 AZ 50
Cold-rolled copper	ASTM B370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.
Copper	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A653 G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.
Lead-coated copper	ASTM B101
Prepainted steel	ASTM A755
Soft lead	3 lbs./sq. ft.
Stainless steel	ASTM A240, 300 Series Alloys
Steel	ASTM A924
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A653 galvanized steel roofing shall be G-60.

~~TABLE 1507.4.3(2) MINIMUM CORROSION RESISTANCE~~

55% Aluminum-zinc alloy coated steel	ASTM A792 AZ 50
5% Aluminum alloy-coated steel	ASTM A875 GF60
Aluminum-coated steel	ASTM A463 T2 65
Galvanized steel	ASTM A653 G-90
Prepainted steel	ASTM A755 [a]

a. ~~Paint systems in accordance with ASTM A755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A463, ASTM A653, ASTM A792 or ASTM A875.~~

1507.5.5 Material standards. *Metal roof shingle roof coverings* shall comply with Table 1507.4.3~~(1)~~. ~~The materials used for metal-roof shingle *roof coverings* shall be naturally corrosion resistant or provided with *corrosion resistance* in accordance with the standards and minimum thicknesses specified in the standards listed in Table 1507.4.3(2).~~

Reason: This code change is intended to clarify code's requirements regarding metal sheet stock used in fabricating metal roof panels and metal roof shingles.

This proposal combines existing Table 1507.4.3(1) and Table 1507.4.3(2) into a single new table, Table 1507.4.3. ASTM A792 AZ 50; ASTM G653 G90 and ASTM A755 currently occur in both tables. From existing Table 1507.4.3(2), ASTM A857 GF 60 and A463 T2 65 do not occur in Table 1507.4.3(1), so they these standards are being added to the new consolidated table.

From existing Table 1507.4.3(2), Footnote "a" is deleted. ASTM A463, ASTM A653, ASTM A792 and ASTM A875 are already incorporated into ASTM A755 and, therefore, these standards and this footnote are not necessary in the code.

There are no changes in code's technical requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification of existing provisions. There are no changes in code's technical requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal cleans up the language and removes redundancies. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Mark Graham, National Roofing Contractors Association, National Roofing Contractors Association (mgraham@nrca.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1507.4.3 Material standards. Metal-sheet *roof covering* systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet *roof coverings* ~~installed over structural decking~~ shall comply with Table 1507.4.3.

TABLE 1507.4.3 METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
5% Aluminum alloy-coated steel	ASTM A875, GF60
Aluminum	ASTM B209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-coated steel	ASTM A463, T2 65
55% ~~A~~aluminum-zinc alloy coated steel	ASTM A792 AZ 50
Cold-rolled copper	ASTM B370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.
Copper	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A653 G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.
Lead-coated copper	ASTM B101
Prepainted steel	ASTM A755
Soft lead	3 lbs./sq. ft.
Stainless steel	ASTM A240, 300 Series Alloys
Steel	ASTM A924
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A653 galvanized steel roofing shall be G-60.

Commenter's Reason: This code change proposal was Approved As Submitted by a 14-0 committee vote. In the committee's reasoning,

they cited "...the proposal cleans up the language and removes redundancies."
After review of my code change proposal, two additional editorial changes are suggested for further clarity.

- Strike "...installed over structural decking..." as these material standards are intended to apply to both metal-sheet roof coverings installed over open structural framing and metal-sheet roof coverings installed over solid or closely-fitted decking.
- Add "55%" to the label for aluminum-zinc alloy coated steel for consistency with the current Table 1507.4.3(1) and Table 1507.4.3(2).

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This code change proposal and this public comment are a clarification to the code's existing requirements and have no cost impact.

Final Hearing Results

S28-22	AMPC1

S30-22

Original Proposal

IBC: 1507.8.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.8.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. <u>Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shingles shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.</u>

Reason: When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shingles and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process.
Further, installation of components such as spray foam insulation also eliminates one surface for shingles to release heat gained through exposure. This slows the release of heat energy, requiring the shingle to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted consistent with the IRC code committee actions. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1507.8.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shingles shall not be backed with materials that <u>will occupy the required air gap space and</u> prevent the free movement of air on the interior side of the spaced sheathing.

Commenter's Reason: The original proposal was recommended for approval by the Committee as submitted (14-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Final Hearing Results

S30-22	AMPC1

S32-22

Original Proposal

IBC: 1507.9.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.9.1 Deck requirements. Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. <u>Where wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shakes shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.</u>

Reason: When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shakes and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process.
Further, installation of components such as spray foam insulation also eliminates one surface for shakes to release heat gained through exposure. This slows the release of heat energy, requiring the shakes to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted consistent with the committee action on S30-22. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1507.9.1 Deck requirements. Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. Where wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shakes shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sheathing.

Commenter's Reason: The original proposal was recommended for approval by the Committee as submitted (14-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Final Hearing Results

S32-22	AMPC1

S34-22

Original Proposal

IBC: 1507.14, 1507.14.1, 1507.14.2, 1507.14.3 (New), 1507.14.4 (New)

Proponents: Chadwick Collins, Kellen Company, Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Building Code

1507.14 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.14.1 Slope. Liquid-applied roofing shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope).

1507.14.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957 or ASTM D3468.

Add new text as follows:

1507.14.3 Application. Liquid-applied roofing shall be installed in accordance with the manufacturer's installation instructions.

1507.14.4 Flashings. Flashings shall be applied in accordance section 1507.14 and the liquid-applied roofing manufacturer's installation instructions.

Reason: This proposal provides clarity and direction that is missing from section 1507.14 regarding application and flashings that other sections within 1507 currently have for those respective materials. The manufacturer's installation instructions have the specifics for each specific product and should be the source material to consult for proper application and flashing guidance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates 1507.14 to mimic the format and content of sister subsections of 1507 to be consistent.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as it does not provide any additional requirements. The requirement for being applied in accordance with the manufacturer's installation instructions is already covered elsewhere in the IBC. The reference in the proposed section 1507.14.4 to section 1507.14 creates a circular reference. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1507.14 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.14.1 Slope. Liquid-applied roofing shall have a design slope of not less than $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope).

1507.14.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957 or ASTM D3468.

1507.14.3 Application. Liquid-applied roofing shall be installed in accordance with<u>this chapter and </u>the manufacturer's installation instructions.

~~**1507.14.4 Flashings.** Flashings shall be applied in accordance section 1507.14 and the liquid-applied roofing manufacturer's installation instructions.~~

Commenter's Reason: From the Committee's feedback, RCMA recognizes the charging flashing language at the beginning of Chapter 15 and has struck the flashing paragraph from the original proposal. RCMA also reviewed the other references in chapter 15 related to application for other materials and has added language to be more alike to those instances for consistency.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This public comment and the original proposal is meant to provide clearer guidance on current applications and will not impact cost of installation.

Final Hearing Results

S34-22	AMPC1

S35-22 Part I

Original Proposal

IBC: 1507.16.6, 1507.17.5

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, NASFM, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.16.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL 7103~~or with both UL 61730-1 and UL 61730-2~~.

1507.17.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 7103~~or with both UL 61730-1 and UL 61730-2~~.

Reason: The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance. UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal properly references the standard for BIPV roofing systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the requirements in UL 61730-1 and UL 61730-2 are contained in UL 7103, making their reference redundant and unnecessary. (Vote: 14-0)

Final Hearing Results

S35-22 Part I AS

S35-22 Part II

Original Proposal

IRC: R905.16.4, R905.17.5

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, NASFM, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R905.16.4 Material standards. *Photovoltaic shingles* shall be *listed* and *labeled* in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

Reason: The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance. UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal properly references the standard for BIPV roofing systems.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Reason: The committee approved this proposal based on the fact that this proposal deletes UL 61730-1 and UL 61730-2, which primarily cover photovoltaic (PV) module safety qualification requirements for construction and requirements for testing. The deletion is based on the fact that UL 61730-1, and UL 61730-2 are part of the requirements within UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance (Vote:10-0).

Final Hearing Results

S35-22 Part II AS

S36-22

Original Proposal

IBC: 1507.16.9 (New), 1507.17.9 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

<u>**1507.16.9 Flashing.** Flashing for *photovoltaic shingles* shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane</u>.

<u>**1507.17.9 Flashing.** Flashing for BIPV roof panels shall be installed in accordance with the*roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane</u>.

Reason: This code change proposal is intended to add guidance to building officials and users of the code by specifically indicating flashings for PV shingles and BIPV roof panels be installed according to the roof covering manufacturer's installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal adds clarity to the code; it does not change the codes existing technical requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1507.16.9 Flashing. Flashing for ~~*photovoltaic shingles*~~ <u>BIPV shingles</u> shall be installed in accordance with the*roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

1507.17.~~9~~<u>7</u> Flashing. Flashing for BIPV roof panels shall be installed in accordance with the*roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

Committee Reason: Approved as modified as the proposal provides clear flashing requirements for BIPV. The modification provides clarity in the section numbering and clairifies that the flashing requirement is intended for BIPV shingles. (Vote: 14-0)

Final Hearing Results

S36-22	AM

S37-22

Original Proposal

IBC: TABLE 1508.2, ASTM Chapter 35 (New)

Proponents: Greg Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

2021 International Building Code

Revise as follows:

TABLE 1508.2 MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VII
Expanded polystyrene	ASTM C578
Extruded polystyrene	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
High-density polyisocyanurate board	ASTM C1289, Type II, Class 4
Mineral fiber insulation board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208, Type II

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications

Reason: Today, the scope of ASTM C552, "Standard Specification for Cellular Glass Thermal Insulation", encompasses applications where the cellular glass is intended to be used on surfaces that operate between -450 F and 800 F. While useful in industrial and pipe applications, this temperature range is much broader than needed for typical building material applications and limits the flexibility in the manufacturing operation to modify the formulation or process to tailor the properties to the needs of the building materials market. Therefore, the new material specification of ASTM C1902, "Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications", is being proposed that is better aligned to service the building materials market. This specification would be differentiated from the existing ASTM C552 specification in the following ways:

1. Narrow the scope of the service temperature range to that of typical building applications

a. From the industrial temperature of -450 F to 800 F to the building temperature range of -50 F to 200 F

2. Remove properties that are not pertinent to the building materials market

a. Hot-surface performance warpage – This test refers primarily to high-temperature insulations that are applicable to hot-side temperatures as high as 800°F to determine material warpage or cracking and is not relevant to buildings.

b. Stress corrosion - This test is for insulation in contact with austenitic stainless-steel piping to assess corrosion of a stressed component and is not relevant to buildings.

3. Add properties that are pertinent to the building materials market

a. Dimensional stability - This is a measurement of a material's change in dimensions in response to various environmental exposure conditions, which can be important to building systems.

Cost Impact: The code change proposal will decrease the cost of construction
The current code language requires products to be over-engineered for the building application and does not address dimensional stability, a key characteristic for building insulation. This proposed change addresses dimensional stability, over-engineering, and enables the

product density to be reduced to enable lower cost and improved thermal resistance of the cellular glass. The improved thermal resistance further enables reduced energy usage for the occupied building.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as it appropriately adds the new ASTM C1902-20 standard as an option. (Vote: 14-0)

Final Hearing Results

S37-22	AS

S43-22

Original Proposal

IBC: [BG] 1511.7, 1511.7.6 (New), 1511.7.6.1 (New)

Proponents: Amanda Hickman, The Hickman Group, Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com)

2021 International Building Code

Revise as follows:

[BG] 1511.7 Other rooftop structures. *Rooftop structures* not regulated by Sections 1511.2 through 1511.6 shall comply with Sections 1511.7.1 through 1511.7.~~5~~6, as applicable.

Add new text as follows:

1511.7.6 Lightning Protection Systems. Lightning protection system components shall be installed in accordance with Section 1511.7.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM 4435-ES-1 or ANSI/SPRI GT-1 in accordance with Sections 1504.6 or 1504.6.1.

Exception: Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

1511.7.6.1 Installation. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.

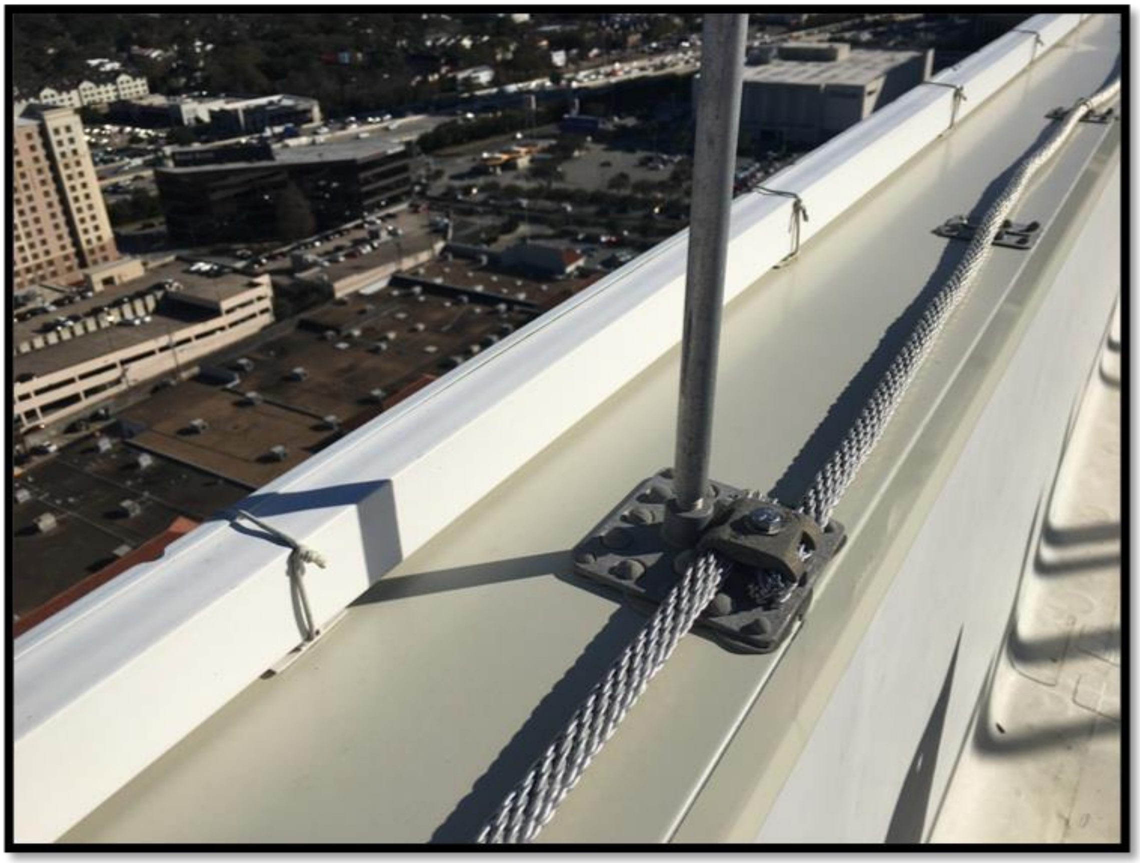
Reason: Progress was made during the Group A cycle to include Lightning Protection Systems (LPS) and their appropriate installation standards in the IBC (G176-21). However, these standards (NFPA 780 and UL 96A) are currently silent on the impact the attachment of LPS have on the roof.

In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

Even in moderate wind events, there have been documented failures of code compliant and tested roof assembly components where LPS were attached.

Roof assembly components such as coping and gutters are required by code to be tested to specific wind loads. LPS attachments to these roof component systems not only alter the wind load on of these tested components, but also alter their performance by restricting thermal movement causing galvanic reaction, leak point, etc.

This proposal clarifies that attachment of LPS to any part of the roof needs to be done in accordance with the installation instructions for the roof assembly, roof covering, metal edge systems, or gutter. Where LPS components attach to or penetrate the roof, they must be properly flashed. Reasonable and readily available methods and details exist to attach LPS systems independent of coping, fascia, gutter and roof assembly components and for flashing of existing LPS attachment methods where penetrations are required. This proposal clarifies that regardless of sequencing challenges which may exist in new or retrofit applications of LPS, the integrity of tested components and the envelope shall be maintained.



Due to the installation of the Lightning Protection System components there may be certain details which require additional hot air welded patches installed under cable splices, frayed cable, and specific connections that could abrade the membrane. Hot air welded patches will provide sufficient protection to the field membrane from abrasion. Pictures below show examples of areas where additional hot air welded patches would be required.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer’s installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as adding an exception for the attachment is inappropriate. The committee stressed that the proposal needs additional coordination between disciplines. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Amanda Hickman, The Hickman Group, Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[BG] 1511.7 Other rooftop structures. *Rooftop structures* not regulated by Sections 1511.2 through 1511.6 shall comply with Sections 1511.7.1 through 1511.7.6.2, as applicable.

1511.7.6 Lightning Protection Systems. Lightning protection system components shall be installed in accordance with Sections 1511.7.6.1, 1511.7.6.2 and 2703 of this code. ~~Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM 4435-ES-1 or ANSI/SPRI GT-1 in accordance with Sections 1504.6 or 1504.6.1.~~

1511.7.6.1 Installation on metal edge systems or gutters. Lightning protection system components ~~directly~~ attached to ANSI/SPRI/FM 4435/ES-1 or ANSI/SPRI GT-1 tested metal edge systems or gutters shall be installed with compatible brackets, fasteners, or adhesives, in accordance with the metal edge systems or gutter manufacturer's installation instructions. When metal edge system or gutter manufacturer is unknown, installation shall be as directed by a registered design professional.~~or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.~~

1511.7.6.2 Installation on roof coverings. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof covering. When the roof covering manufacturer is unknown, installation shall be as directed by a registered design professional.

Commenter's Reason:
Progress was made during the Group A cycle to include Lightning Protection Systems (LPS) and their appropriate installation standards in the IBC (G176-21). However, these standards (NFPA 780 and UL 96A) are currently silent on the impact the attachment of LPS have on the roof.

In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

Roof assembly components such as coping, and gutters are required by code to be tested to specific wind loads. Any attachments to these edge metal systems can alter the wind load on these tested components and therefore the performance of the systems.

This proposal clarifies that attachment of LPS needs to be done in accordance with the manufacturer installation instructions for the roof assembly, roof covering, metal edge systems, or gutter they are being attached to. Manufacturer is defined as a person or business that produced for sale or installation, the roof components referenced above (coping, gutters, roof membranes) and is often the roofing contractor, the roofing membrane manufacturer, or another manufacturing company responsible for the manufacturing of these tested components. Where LPS components attach to or penetrate the roof, they must be properly flashed. There are situations where the manufacturer of the metal edge system, gutter, or roof covering is unknown, or out of business. In these situations, a registered design professional can provide direction on an attachment method that will retain the integrity of the roof, while allowing a lightning protection system to be installed.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction

If the Lightning protection system components are attached by adhesion or screw fasteners there will be no additional impact to costs. If the metal edge manufacturer's installation instructions require the installation of a bracket or some other device not yet developed there will be an increase in the material and labor to install the lightning protection system and/or roofing system.

Final Hearing Results

S43-22	AMPC1

S44-22

Original Proposal

IBC: 1512.1

Proponents: Emily Lorenz, International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing*roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide*positive roof drainage* <u>and meet the requirements of Section 1608.3 and Section 1611.2</u>.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for*positive roof drainage*. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Reason: This additional language is necessary to ensure public life-safety. It emphasizes the IBC requirement that susceptible bays be analyzed for ponding instability during structural design/loads analyses that are required incidental to the recovering or replacement of existing *roof coverings,* which adds new live loads to existing roof structures. As the IBC has evolved through periodic updates, there have been fundamental changes in its requirements related to roof drainage, structural requirements for ponding instability, and, with climate change, significant increases in design rain loads (both rainfall intensity and duration). Annually, re-roofing projects comprise about three-quarters of U.S. low-sloped roofing projects. This additional language is needed to reduce the likelihood of catastrophic roof collapses that that occur from uncontrolled ponding and/or inadequate drainage that is directly related to new live loads imposed onto existing roof structures from re-roofing.

The following recent studies and case studies further support, in much greater detail, justification for the proposed additional language to Exception 1.

Fundamental Changes Related to Drainage

A 2012 study published by the American Society of Plumbing Engineers (ASPE) and the International Association of Plumbing and Mechanical Officials (IAPMO) concluded: "The research produced stunning results that verified that the sizing method for storm drainage systems, as required in the plumbing codes, is inaccurate." (Ballanco 2012) In summary, the roof drains design criteria the engineering/construction industry has been using for more than 70 years is flawed. Drainage assemblies' flow rates are based on the head of water over the drains and their geometry.

This research led to significant changes to the*IPC*. As of 2015, the IPC no longer publishes flow rates through drains. The IPC requires the designer to use "the published roof drain flow rate" for drainage design. The problem is that, at the time of this writing, there is only one drain manufacturer that publishes flow rates for their roof drains. The only published data on flow through drains is *FM Global Property Loss Prevention Data Sheets 1-54: Roof Loads for New Construction,* which essentially addresses only one type of drain. As a result of these code changes, the IIBEC-RCI Foundation recently published the second edition of *Roof Drainage* (IIBEC-RCI Foundation 2021), which provides an in-depth explanation of the new drainage design criteria and a guide for roof drainage designers. Accordingly, roof drainage systems that were designed per plumbing code requirement prior to IPC 2015 should be re-evaluated as part of roof recovering or replacement over an existing *roof covering.*

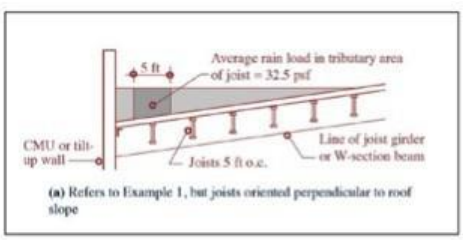
Structural Requirements for Ponding Instability

The second major change to codes involves structural requirements for ponding instability. Currently Section 1512.1 Exception 1 allows slopes less than ¼ inch per foot for re-roofing projects. By definition (2021 IBC Section 202), a *susceptible bay* is "a roof or portion thereof with a slope less than ¼ inch per foot." Sections 1608.3 and 1611.2 require that *susceptible b*ays be evaluated for ponding instability in accordance with Chapters 7 and 8 of ASCE 7. This proposed change allows a slope of less than ¼ inch per foot only if the roof is not susceptible to ponding instability.

ASCE 7-16 significantly revised its "Chapter 8: Rain Loads" (ASCE 2016). Historically, ASCE and the model codes required ponding instability to be investigated when the roof slope was less than ¼ inch per foot. Ponding instability is a serious life-safety and structural issue for roofs. We have also learned that *ponding instability* is not just an issue on roofs with slopes less than ¼-inch per foot, but can also an issue on many more roof configurations. In other words, the potential for roof collapse resulting from ponding instability is more widespread than originally thought, and there are a number of roofs constructed before the 2016 design standards were enacted that have never been analyzed for ponding instability.

The most significant change in the evaluation of ponding instability addressed in ASCE 7-16 is structural orientation. The load on the joists is much greater if the joists are oriented parallel to the wall to which the water drains than if the joists are perpendicular to the wall. Below is example of a collapse in Dallas where ponding instability and structural orientation was an issue. The build-up of water on the 1st and 2nd joists running parallel to the wall was much greater than if the joists had been perpendicular to the wall. This condition resulted in excessive rainwater load on the joists. **Figure 1** (left) shows the roof collapse, and **Figure 1** (right) shows the structural orientation.

Figure 2 is an excerpt from "Roof Drainage Design, Roof Collapses, and the Code" (Patterson and Mehta 2018) illustrating the distribution on a roof with joists running parallel to the drainage wall (Patterson and Mehta 2018). In most cases these joists were designed using a live load of 16 psf, so the rainwater live load is double the design live load.



(a) Refers to Example 1, but joists oriented perpendicular to roof slope

In a paper by Coffman and Williamson (2019), they discuss ponding that can occur due to differences between "design slope" found in IBC Chapter 15 and "roof slope" used in ASCE 7. Their recommendation is "When design constraints necessitate a 1/4 in 12 design slope be used, the framing members should be cambered or investigated for ponding."

Increases in Design Rain Loads

ASCE 7-16 also recognized another important roof drainage design issue in "Section 8.2 Roof Drainage." There have been two rainfall rates used for the design of secondary drainage systems. Currently, the IPC requires a 1-hour, 100-year rainfall rate for designing the secondary drainage system, while the *National Standard Plumbing Code* requires a 15-minute, 100-year rainfall rate for designing the secondary drainage system. The original *IPC* also included the requirement to use a 15-minute, 100-year rainfall rate for designing the secondary drainage system, which was also in the *Standard Plumbing Code* before the IPC replaced it. ASCE 7-16 added the requirement that the secondary drainage system be designed based on the 15-minute, 100-year rainfall rate, which is contrary to the current *IPC* requirements. The *IPC* requirements are also in conflict in the current IBC, which is the reason why this change is important. The 15-minute, 100-year rainfall rate is double (two times) the 1-hour, 100-year rainfall rate. In other words, to comply with ASCE 7 and Section 1608.3 and Section 1611.2 of the IBC, the secondary drainage system must be designed using double the design rainfall rate required in the IPC.

As a result, the secondary drainage system design can be based on the IPC and not meet the requirements of ASCE and the IBC. Chapter 3, Sections 3.4 and 3.5 of *Roof Drainage* (IIBEC-RCI Foundation 2021) provides an in-depth discussion of the use and importance of the 15-minute, 100-year design standard for secondary drainage systems. Essentially, ASCE 7 has doubled the "Rainwater Loads" on roofs.

In addition, Levine (2021) conducted a review of US rainfall intensity data reports and various plumbing codes from 1935 to the present. He found that “plumbing codes have remained relatively static, rarely contain current rainfall intensity data, and truly represent a minimum standard with regard to the design of roof drainage systems.”

Catastrophic Failures Due to Ponding

Ponding water on roofs, the accumulation of water on roofs, or*ponding instability* has the potential to cause serious structural/life safety issues, including roof collapses. There is a precedent for the ICC recognizing the significance of changes in design standards based upon new inputs, especially when related to life-safety issues. “Section 403.5 Bracing for unreinforced masonry parapets upon reroofing” and “Section 403.8 Roof diaphragms resisting wind loads in high-wind regions” in the IEBC require the correction of potentially hazardous conditions from seismic and wind forces. When reroofing a building in a high-wind region, an analysis of the structural diaphragms and correction of the deficiencies are required. IEBC Section 302.1, Dangerous Conditions, gives the building official “the authority to require the eliminate of conditions deemed *dangerous*.” IEBC Section 706.2, Addition or replacement of roofing or replacement of equipment, requires replacement or alteration to structural elements when the structural element’s design dead, live or snow load, including snow drift effects, is increased by 5 percent. In roof re-cover situations, the additional load from the re-cover roof is not the only increase in gravity loads, because the changes in the IBC and ASCE 7, as discussed previously, have doubled the gravity load from rainwater. These “Rain Loads” changes in ASCE 7 were made to address significant life-safety structural issues related to water accumulation on roofs. Michael O’Rourke, PhD, PE and Aaron Lewis, PE have published an excellent monograph regarding rain loads (O’Rourke and Lewis 2020).

Case Studies of Failures

Case Study 1: Roof Failure in Walhalla, South Carolina, on October 8, 2017 (**Figures 3-4**)

Background:

Construction Science and Engineering, Inc. of Westminster, SC, performed an investigation following the collapse of a roof structure in Walhalla, SC, in October of 2017. Research was limited due to the number of weather recording stations proximate to the subject building; however, a private weather station within 3 miles of the building reported 4.3 in. of rain on the day of the event.

Findings:

In the opinion of Construction Science and Engineering, Inc., the primary cause of the roof collapse was due to excessive and rapid water accumulation on the roof during the significant weather event on October 8, 2017. The reported 5 in. of rainwater reported by the adjacent resident was similar to the 4.3 in. of rainwater measured from the closest private weather station. Additionally, the measured 3.5 in. water depth at the rear of an adjacent building 3 days after the rain event corroborated the reported rain amounts.

A 20 psf unreduced roof design load is specified as the standard in the applicable building code. An accumulation of 5 in. of rainwater equates to approximately 26 psf load on a roof structure. This roof load represents approximately 30% higher load than the current code prescribed design load. Due to the installation of the granular cap sheet below the tile parapet cap, the weight of the water is believed to have initiated the steel truss collapse by pulling a portion of the masonry brick parapet wall onto the roof. This impact force would result in the damage observed at the subject property.

Per Figure 1106.1(3), 100-Year, 1-Hour Rainfall (Inches) Eastern United States provides the 100-year hourly rainfall rate is 4.0 inches for Walhalla, South Carolina.

Case Study 2:

Roof Failure in Kinston, North Carolina, on August 1, 2020 (**Figures 5-7**)

Background:

REI Engineers, Inc. of Greenville, NC, performed an investigation following the collapse of a roof structure in Kinston, NC, in August of 2020.

Findings:

In the opinion of REI Engineers, Inc., the primary cause of the roof collapse was due to excessive loading of the roof framing system. Examination of the roof storm drainage system showed the primary drainage scuppers to obstructed by debris. Additionally, no secondary (emergency) drainage was observed. The combined factors of failure of the primary drainage system and lack of an overflow drainage system most likely caused the excess amount of water to accumulate on the roof, as it was contained by the structure’s parapet. This additional load exceeded the structural framing’s ability and a failure of the framing occurred by collapse.

Bibliography: American Society of Civil Engineers (ASCE). 2016. *ASCE 7 -16*: *Minimum Design Loads Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. Reston, VA: ASCE.
Ballanco, Julius. 2012. *Storm Drainage System Research Project: Flow Rate Through Roof Drains.* Rosemont, IL: American Society of Plumbing Engineers (ASPE) Research Foundation.

Coffman, Scott D., and Thomas Williamson. 2019. “Low-Slope Roofs: Design Solutions for Building Code-Permitted Low-Slope Applications that Cause Ponding Water.”
Civil + Structural Engineering. Fayetteville, AR: Zweig Group.

Levine, Jeffrey. 2021. “Rainfall Intensity Changes Over Time: Have the Codes Kept Pace?,” *Interface*, 39 (10): International Institute of Building Enclosure Consultants.

O’Rourke, Michael, and Aaron R. Lewis. 2020. *Rain Loads: Guide to the Rain Load Provisions of ASCE 7-16*. Reston, VA: ASCE.

Patterson, Stephen, and Medan Mehta. 2021. *Roof Drainage.* Second Edition, Raleigh, NC: IIBEC-RCI Foundation.

Patterson, Stephen L., and Madan Mehta. 2018. “Roof Drainage Design, Roof Collapses, and the Code” in *Proceedings of the 33rd RCI International Convention and Trade Show*, March 22-27, 2018: RCI.

Cost Impact: The code change proposal will increase the cost of construction
Most buildings that will be reroofed already meet IBC requirements, and there will be no increased costs resulting from the proposed additional language. Most residential and multi-family buildings’ roofs (typically steep-slope) and commercial buildings’ roofs that drain over the edge and buildings with rigid structures will not be affected.

There will be increased costs to buildings with flexible structural elements that are susceptible to *ponding instability,* which leads to roof structure overloading and catastrophic roof collapse. These buildings would fall into the “Dangerous Condition” category, as defined in IEBC Section 401.3 (however, it should be noted that the IEBC is typically a voluntary code is most jurisdictions, and accordingly, this issue needs to be fully discussed in the IBC).

For these “Dangerous Condition” buildings, additional cost would involve a structural engineering evaluation to determine that the building structure with new live loading is safe. In a majority of cases, it is presumed that structural engineering evaluation would be the extent of the additional costs, since building structures are typically designed with sufficient additional safety factors. In cases where a structural engineering evaluation indicates a building/roof structure is unsafe, there would be additional costs to strengthen, supplement, replace or otherwise alter the structure, as required to carry the additional loads. These costs would vary from building-to-building depending upon the extent of the discovered issues. In most cases, overflow drains or scuppers could be added or resized to limit the amount of water that would accumulate on the new roof. Overflow scuppers costs vary from $500 to $1,500 depending on their complexity.

Regardless, the costs to evaluate and/or modify a structure that has been found to be unsafe from additional loading caused by re-roofing, is necessary to protect public life-safety.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adds requirements to increase public life-safety relative to ponding instability. The committee encouraged further coordination with the IEBC. (Vote: 9-5)

Final Hearing Results

S44-22	AS

S45-22

Original Proposal

IBC: 1512.1
Proponents: Emily Lorenz, International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing*roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

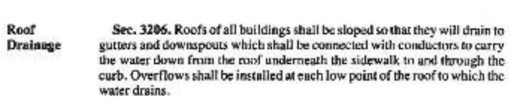
1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide*positive roof drainage*.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for*positive roof drainage* <u>and have been determined to resist all design loads</u>. For the purposes of this exception, existing secondary drainage or*scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Reason: This amended language is necessary to ensure public life-safety. It clarifies specifically when the Exception 2 is applicable so as to prevent roof collapses/structural overload failures from uncontrolled ponding, incidental to new dead-loads imposed onto existing roof structures, inadequate/missing secondary drainage assemblies at existing roofs, or alteration of drainage assemblies during re-roofing projects. This amended language is also needed to ensure preservation of physical assets or operations covered by existing roofs that are subject to re-roofing. The IBC and its predecessor building codes have long called for scuppers (or other secondary drainage measures) within all roofs that incorporate parapet walls and within other low-slope roofs, to prevent roof-structure overload and collapse. If during a low-slope re-roofing project, an owner discovers that their as-constructed roof has defective or missing code-required emergency overflow or secondary-drainage assemblies, the existing roof was most likely not code-compliant at the time of its installation and was and remains a danger to public life-safety from catastrophic collapse.
The following recent studies further support, in much greater detail, justification for the proposed additional language to Exception 2.

Secondary Drainage Should Have Been Provided During Original Construction

Chapter 15, Section 1502.2 Secondary (emergency overflow) drains or scuppers requires that, "secondary (emergency overflow) drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason." Generally, this provision only applies to low-sloped roofs with parapet walls. As the title suggests, the *secondary drainage system* is an *emergency* system that is required to prevent the roof structures from collapsing in the even of an unsafe buildup of water. The s*econdary (emergency overflow) drains or scuppers* are the safety valves for the roof structure.

Building codes have required that buildings have an
emergency overflow drainage system since modern codes were introduced. Below is an excerpt from Chapter 32 Roof Construction and Covering from the first *Uniform Building Code* (1927) requiring that, "Overflows … (be) installed at each low point to which the water drains." (**Figure 1**)


Roof Drainage

Sec. 3206. Roofs of all buildings shall be sloped so that they will drain to gutters and downspouts which shall be connected with conductors to carry the water down from the roof underneath the sidewalk to and through the curb. Overflows shall be installed at each low point of the roof to which the water drains.

Doesn't Apply to Roofs Designed to Drain Over Edge

The provision for an *emergency overflow drainage system* does not apply to roofs that drain over the edge, which are the vast majority of buildings. These include most residential buildings, multi-family buildings, pre-engineered metal buildings, and buildings with low-slope roofs that drain over the edge into the gutters. The provision only applies to roofs where water can accumulate when the primary drains are blocked, i.e., buildings with parapet walls. A building with parapet walls and no *emergency overflow drainage system* did not meet building codes when they were built and do not meet the building codes today.

Exception: Buildings where the structure is sufficient to support the buildup of water do not require overflow. One example of this would be a concrete structure designed to be a future floor. In many cases, these roofs will support water that would build up to the top of the parapet wall. A typical parapet 2-foot wall would result in 2-feet of water buildup at the perimeter or 125 psf of Rain Load (**Figure 2**).

Exception: Buildings where the structure is sufficient to support the buildup of water do not require overflow. One example of this would be a concrete structure designed to be a future floor. In many cases, these roofs will support water that would build up to the top of the parapet wall. A typical parapet 2-foot wall would result in 2-feet of water buildup at the perimeter or 125 psf of Rain Load.

Secondary Drainage Essential to Structural Integrity

An *emergency overflow drainage system* is essential to the structural integrity of a building. It is the safety valve to prevent an unsafe water buildup on a roof in the case that the primary drainage system is blocked or if the rainfall rate exceeds the design rainfall rate for the primary drainage system. The head of water over an overflow drain or scupper is a critical component in the design calculus for roof structures. Both the IBC and ASCE-7 require that the roof structure be designed to support the weight (head) of water that accumulates over the *emergency overflow drainage system* assuming the primary drainage are blocked. **Figure 3** is an excerpt from Chapter 16, Section 1611.1 from the 2021 IBC describing the design requirements for "Rain Loads."

SECTION 1611
RAIN LOADS

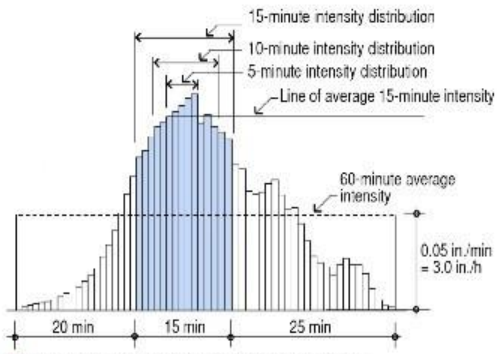
1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the *load* of rainwater as per the requirements of Chapter 8 of ASCE 7. The design rainfall shall be based on the 100-year 15-minute duration event, or on other rainfall rates determined from approved local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figures 1611.1(1) through 1611.1(5) shall be permitted.

Increases in Design Rain Loads

It is important to note that in the 2021 edition there was a significant change. Previously, the IBC and IPC required using the 1-hour, 100-year rainfall rate for the design of both the primary and secondary drainage systems. Section 1611.1 has changed the design rainfall rate to the 15-minute, 100-year rainfall rate. The requirement to use the 15-minute rainfall rate was made in ASCE 7-16 (ASCE 2016), so both ASCE and IBC require the 15-minute rainfall rate for designing overflow systems. The 15-minute rainfall rate is approximately double the 1-hour rainfall rate. **In other words, to comply with ASCE 7 and Section 1611.1. of the*IBC,* the secondary drainage system must be designed using double the design rainfall rate.** The result is that the new code requirement significantly increases the Rain Load on a building.

The change from the 1-hour to the 15-minute duration rainfall rate is well supported in the technical literature. Chapter 3, Section 3.4 and 3.5 of *Roof Drainage* (IIBEC-RCI Foundation 2021) provides an in-depth discussion of the use and importance of the 15-minute, 100-year design standard for secondary drainage systems. There is also strong precedence in the codes for using the 15-minute rainfall rate for secondary drains. Prior to the consolidation of codes, the *Standard Plumbing Code* required using the 15-minute rainfall rates. The National Standard Plumbing Code requires using the 15-minute rainfall rate. Also, the first IPC required using the 15-minute duration rainfall rate for secondary drain systems. This requirement was changed in the 2000 IPC.

From a structural design perspective, rainfall rates commonly exceed the 1-hour, 100-year rainfall rate for short durations. **Figure 4** is an excerpt from *Roof Drainage* (IIBEC-RCI Foundation 2021) showing a typical distribution of rainfall rates occurring over 1-hour. The area above the 3.0 in/h line illustrate the time when the Rain Load would exceed the design Rain Load using the 1-hour rainfall rate. The illustration also shows (in blue) the 15-minute rainfall rate, which is about double the 1-hour rainfall rate. The Rain Load from 15-minute duration rainfall rate is now recognized as the appropriate standard. These structural design changes were made because of the serious recurring problem of roof collapses.



(a) Rainfall intensity distribution over 60 minutes. Width of each rectangle is one minute.

Climate change is causing more frequent and more intense rain events to occur. A good example was Hurricane Harvey. The flooding in Houston resulting from Hurricane Harvey contributed to the collapse of several roofs. A common scenario was that the flood water filled the storm drainage systems preventing the primary drains from functioning properly. This flooding severely tested the *secondary emergency overflow drainage system*. Most passed the test, but several roofs did not.

Another major change in the IPC significantly affects the design of a*secondary emergency overflow drainage system.* A 2012 study (Ballanco 2012) published by the American Society of Plumbing Engineers and the International Association of Plumbing and Mechanical Officials in found that, "***The research produced stunning results that verified that the sizing method for storm drainage systems, as required in the plumbing codes, is inaccurate***." In other words, **the drainage design criteria we have been using for more than 70 years is wrong … stunning indeed**. The study showed that flow rates are based on the head of water over the drains and the drain geometry, which is the very data a structural engineer must use in determining "Rain Loads." So not only have we changed the rainfall rate for designing secondary emergency drainage systems, we have an entirely different standard for determining the head (weight) of water over the drains.

As stated previously, the requirement that the re-roof system includes an appropriate*emergency overflowdrainage system* has been in the National Codes since these codes addressed reroofing. Chapter 32 Re-Roofing was added to the Appendix of the*Uniform Building Code* in 1979. Chapter 32 Re-Roof required that the new roof *conform the applicable provisions of* Chapter 32 of this code. Section 3207 (c) required Overflow Drains and Scuppers. Below is an excerpt from the 1979 UBC addressing the applicable provision related to the requirement for Overflow Drains and Scuppers. There was a reason that for almost 40 years the codes required the reroofing system to have an appropriate *secondary emergency overflow drainage system* (**Figure 5**).

(c) **Overflow Drains and Scuppers.** Where roof drains are required, overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches above the low point of the roof, or overflow scuppers having three times the size of the roof drains may be installed in adjacent parapet walls with the inlet flow line located 2 inches above the low point of the adjacent roof and having a minimum opening height of 4 inches.

Overflow drains shall be connected to drain lines independent from the roof drains.

Buildings are typically reroofed every 20 years or so. The IBC requires building permits for recovering the existing roof or for reroofing. This is typically the only time during the life of a building that the Building Official and the Code are involved with the roof. This is the appropriate time to make sure the building structure is safe and that the roof drainage system was constructed properly in accordance with the code. The omission of an appropriate *emergency overflow drainage system* is a design and/or construction defect that should be corrected. A building constructed without an appropriate *emergency overflow drainage system* does not meet the code now or in the past. It is critical that this provision be reinstated to ensure our buildings are safe.

Bibliography:

American Society of Civil Engineers (ASCE). 2016. *ASCE 7 -16*: *Minimum Design Loads Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. Reston, VA: ASCE.

Ballanco, Julius. 2012. *Storm Drainage System Research Project: Flow Rate Through Roof Drains.* Rosemont, IL: American Society of Plumbing Engineers (ASPE) Research Foundation.

Coffman, Scott D., and Thomas Williamson. 2019. "Low-Slope Roofs: Design Solutions for Building Code-Permitted Low-Slope Applications that Cause Ponding Water." *Civil + Structural Engineering*. Fayetteville, AR: Zweig Group.

Levine, Jeffrey. 2021. "Rainfall Intensity Changes Over Time: Have the Codes Kept Pace?," *Interface*, 39 (10): International Institute of Building Enclosure Consultants.

O'Rourke, Michael, and Aaron R. Lewis. 2020. *Rain Loads: Guide to the Rain Load Provisions of ASCE 7-16*. Reston, VA: ASCE.

Patterson, Stephen, and Medan Mehta. 2021. *Roof Drainage.* Second Edition, Raleigh, NC: IIBEC-RCI Foundation.

Patterson, Stephen L., and Madan Mehta. 2018. "Roof Drainage Design, Roof Collapses, and the Code" in *Proceedings of the 33rd RCI International Convention and Trade Show*, March 22-27, 2018: RCI.

Cost Impact: The code change proposal will increase the cost of construction
Most buildings that will be re-roofed already meet IBC requirements, and there will be no increased costs resulting from the proposed additional language. Most residential and multi-family buildings' roofs (typically steep-slope) and commercial buildings with roofs that drain over the edge and buildings with rigid structures will not be affected. The cost of adding parapet wall emergency through-wall scuppers or other secondary drainage measures at low-slope roofs that require such assemblies, should have been borne at the time of the existing low-slope roof's original construction, based on requirements of earlier adopted building codes.

If found to missing, parapet wall through-wall scuppers or other secondary drainage measures are typically of nominal cost to retrofit into existing buildings/roofs. The costs to add or modify an emergency overflow drainage systemvaries. In many cases, all that is required is to add overflow drains or scuppers to control the volume of water that would accumulate on the roof. Overflow scupper costs vary from $500 to $1500 depending on their complexity and overflow drains vary from $1500 to $3000.

There will be increased costs to buildings with flexible structural elements that are susceptible to ponding instability,which leads to roof structure overloading and catastrophic roof collapse. These buildings would fall into the "Dangerous Condition" category, as defined in IEBC Section 302.1. For these "Dangerous Condition" buildings, additional cost would involve a structural engineering evaluation to determine that the building structure with new, added dead-loading is safe and additionally, that the new dead-loading will not alter the function of in-place secondary drainage systems. In most cases, it is presumed that structural engineering evaluation would be the extent of the additional costs, since building structures are typically designed with sufficient margin-of-safety factors.

In cases where a structural engineering evaluation indicates a building/roof structure is unsafe, there would be additional costs to strengthen, supplement, replace or otherwise alter the structure, as required to carry the additional loads. These costs would vary from building-to-building depending upon the extent of the discovered issues.

Regardless, the costs to evaluate and/or modify a structure that has been found to be unsafe from additional loading caused by re-roofing or from inadequate or missing secondary drainage systems, is necessary to protect public life-safety and property/operations below existing roofs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.
Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage*.

2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage* and ~~have been determined to resist all design loads~~meet the requirements of Section 1608.3 and Section 1611.2. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Committee Reason: Approved as modified as the proposal provides a reasonable addition, to the exception in section 1512.1, as ponding instability rarely provides warning prior to failure. The committee did note that the proposal could penalize existing buildings. The modification provides the required specific pointer. (Vote: 10-4)

Final Hearing Results

S45-22	AM

S51-22

Original Proposal

IBC: 1512.2
Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

~~**Exception**~~ **Exceptions:**

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table 1507.1.1(1), Table 1507.1.1(2), and Table 1507.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   - 3.1. It is permitted by the roof covering manufacturer and self-adhered underlayment manufacturer,
   - 3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, and
   - 3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Reason: The use of a self-adhered polymer modified bitumen membrane complying with ASTM D1970 is one of several underlayment options permitted for roof coverings in the IBC. ASTM D1970 self-adhered membranes were first recognized in the 2000 IBC and IRC as an underlayment and as an option for an ice barrier. After 20 years of code implementation, it remains approved by shingle manufacturers, underlayment manufacturers and building codes, and has been consistently observed to perform very well as a method for preventing water intrusion in the event the roof covering is lost or damage.
While the code requires materials and methods for roof replacement to comply with Chapter 15, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes. Section 1512.2requires roof replacement to include the removal of all roof covering layers down to the roof deck. An exception permits one additional layer of an ice barrier membrane where the existing roof has an ice barrier membrane.

As currently written, the code would imply that a self-adhered membrane would have to be removed during a roof replacement. However, depending on the decking material, many self-adhered membranes can be difficult to remove. Some may not be able to be removed without damaging or removing the roof deck. Damaging the deck and/or removing the roof decking can be expensive and unnecessary.

This proposal is a collaboration between the Insurance Institute for Business and Home Safety (IBHS), the Asphalt Roofing Manufacturers Association (ARMA), and the National Roofing Contractors Association (NRCA). It provides specific requirements on acceptable methods for dealing with existing self-adhered membranes during a roof replacement. The underlayment methods in the 2021 IBC include specific methods for preventing water intrusion in the event the roof covering is damaged or lost in high wind regions. The changes proposed herein seek to maintain that level of protection during roof replacement.

ARMA provides guidance on the removal of self-adhered membrane in their Technical Bulletin, Self-Adhering Underlayment Removal Prior to Steep Slope Re-Roofing: *"Removal of self-adhering underlayment is always recommended in situations in which it can be removed without damaging the deck….If one layer of self-adhering underlayment is in place, and it is not possible to remove it without damaging the deck, installation of a second layer of underlayment over the existing membrane may be permissible: Check with the underlayment manufacturer's installation instructions and local building codes for details. Offset end and side laps in the new and existing underlayment to minimize thickness build-up and "feather in" the new underlayment by extending the new material a minimum of 8" up the slope onto the bare deck. This will reduce the likelihood of problems with drainage and aesthetics. If two or more layers of self-adhering underlayment are in place, all layers should be removed."*

In lieu of an additional layer of self-adhered underlayment, this proposal also permits felt underlayment to be installed in accordance with Tables 1507.1.1(1), 1507.1.1(2), and 1507.1.1(3).

This proposal also provides industry recommended clarifications regarding the installation of an additional layer of an ice barrier membrane.

Cost Impact: The code change proposal will decrease the cost of construction
For existing roofs with one layer of self-adhered membrane underlayment, this proposal would reduce the cost of construction by permitting the existing layer to remain in place.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.
Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the roof covering manufacturer and ~~self-adhered~~ new ice barrier underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table 1507.1.1(1), Table 1507.1.1(2), and Table 1507.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and new self-adhered underlayment manufacturer,
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, and
   3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Committee Reason: Approved as modified as the proposal is reasonable and consistent with industry standard practice. The modification clarifies the intent consistent with industry standard practice. (Vote: 13-1)

Final Hearing Results

S51-22 AM

S58-22 Part I

Original Proposal

IBC: [A] 110.3.6, 1512.3; IEBC: [A] 109.3.5, [BS] 705.3
Proponents: Tim Earl, GBH International, the Gypsum Association (tearl@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 110.3.6 Lath, ~~gypsum board~~ and gypsum panel product inspection. Lath~~, *gypsum board*~~ and *gypsum panel product* inspections shall be made after lathing~~, *gypsum board*~~ and *gypsum panel products*, interior and exterior, are in place, but before any plastering is applied or ~~*gypsum board* and~~ *gypsum panel product* joints and fasteners are taped and finished.

Exception: *Gypsum* ~~*board* and *gypsum*~~ *panel products* that are not part of a fire-resistance-rated assembly or a shear assembly.

1512.3 Roof recovering. Where the application of a new *roof covering* over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with *gypsum* <u>*panel products*</u> ~~*board*~~, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

Reason: Gypsum board is a type of gypsum panel product. These two sections erroneously use the term board instead of panel. Exterior products are often glass mat, which are panels but not boards, so panel is the appropriate term here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup with no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S58-22 Part I	AS

S58-22 Part II

Original Proposal

IRC: R109.1.5.1
Proponents: Tim Earl, GBH International, the Gypsum Association (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R109.1.5.1 Fire-resistance-rated construction inspection. Where fire-resistance-rated construction is required between *dwelling units* or due to location on property, the *building official* shall require an inspection of such construction after lathing or~~gypsum board or~~ gypsum panel products are in place, but before any plaster is applied, or before ~~board or~~ panel joints and fasteners are taped and finished.

Reason: Gypsum board is a type of gypsum panel product. These two sections erroneously use the term board instead of panel. Exterior products are often glass mat, which are panels but not boards, so panel is the appropriate term here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup with no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Reason: The proposal was approved in coordination with G1-22. This removes redundant terminology, and is basically editorial. The recommendation is from the industry that should know the products best. (Vote: 10-0)

Final Hearing Results

S58-22 Part II	AS

S62-22

Original Proposal

IBC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 15, SECTION 1504, TABLE 1504.2, 1504.6, CHAPTER 16, SECTION 1602, 1602.1, SECTION 1609, 1609.1.1, 1609.3, FIGURE 1609.3(1), FIGURE 1609.3(2), FIGURE 1609.3(3), FIGURE 1609.3(4), FIGURE 1609.3(5), FIGURE 1609.3(6), FIGURE 1609.3(7), FIGURE 1609.3(8), FIGURE 1609.3(9), FIGURE 1609.3(10), FIGURE 1609.3(11), FIGURE 1609.3(12), 1609.3.1, TABLE 1609.3.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

Revise as follows:

[BS] WINDBORNE DEBRIS REGION. Areas within *hurricane-prone regions* located:

1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic ~~design~~ wind speed, *V*, is 130 mph (58 m/s) or greater; or
2. In areas where the basic ~~design~~ wind speed, *V*, is 140 mph (63 m/s) or greater.

For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure ~~1609.3.(1)~~ 1609.3.(2). For *Risk Category* III health care facilities, and *Risk Category* IV buildings and structures ~~and *Risk Category* III health care facilities~~, the windborne debris region shall be based on Figure ~~1609.3(2)~~ 1609.3(3) and Figure 1609.3 (4), respectively .

Add new definition as follows:

[BS] WIND DESIGN GEODATABASE

. The ASCE database (version 2022-1.0) of geocoded wind speed design data.
The ASCE Wind Design Geodatabase of geocoded wind speed design data is available at https://asce7hazardtool.online/.

CHAPTER 15 ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1504 PERFORMANCE REQUIREMENTS

Revise as follows:

TABLE 1504.2 CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161OR D7158

MAXIMUM BASIC WIND SPEED, *V*, FROM FIGURES 1609.3(1)–~~(8)~~ (4) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd}, FROM Table 1609.3.1 (mph)	ASTM D7158 [a] CLASSIFICATION	ASTM D3161 or UL 7103 CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F

MAXIMUM BASIC WIND SPEED, *V*, FROM FIGURES 1609.3(1)–~~(8)~~ (4) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, *V*, FROM Table 1609.3.1 (mph)	ASTM D7158 CLASSIFICATION	ASTM D3161 or UL 7103 CLASSIFICATION
168	130	H	F
181	140	H	F
194	150	H	F

For SI: 1 foot = 304.8 mm; 1 mph = 0.447 m/s.

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic ~~design~~ *wind speed*, V, shall be determined from Figures 1609.3(1) through~~1609.3(12)~~ 1609.3(4) as applicable.

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1602 NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (~~km/hr~~ m/s) where applicable.
V	=	Basic ~~design~~ wind speeds, miles per hour (mph) (~~km/hr~~ m/s) determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1609 WIND LOADS

Revise as follows:

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic ~~design~~ *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

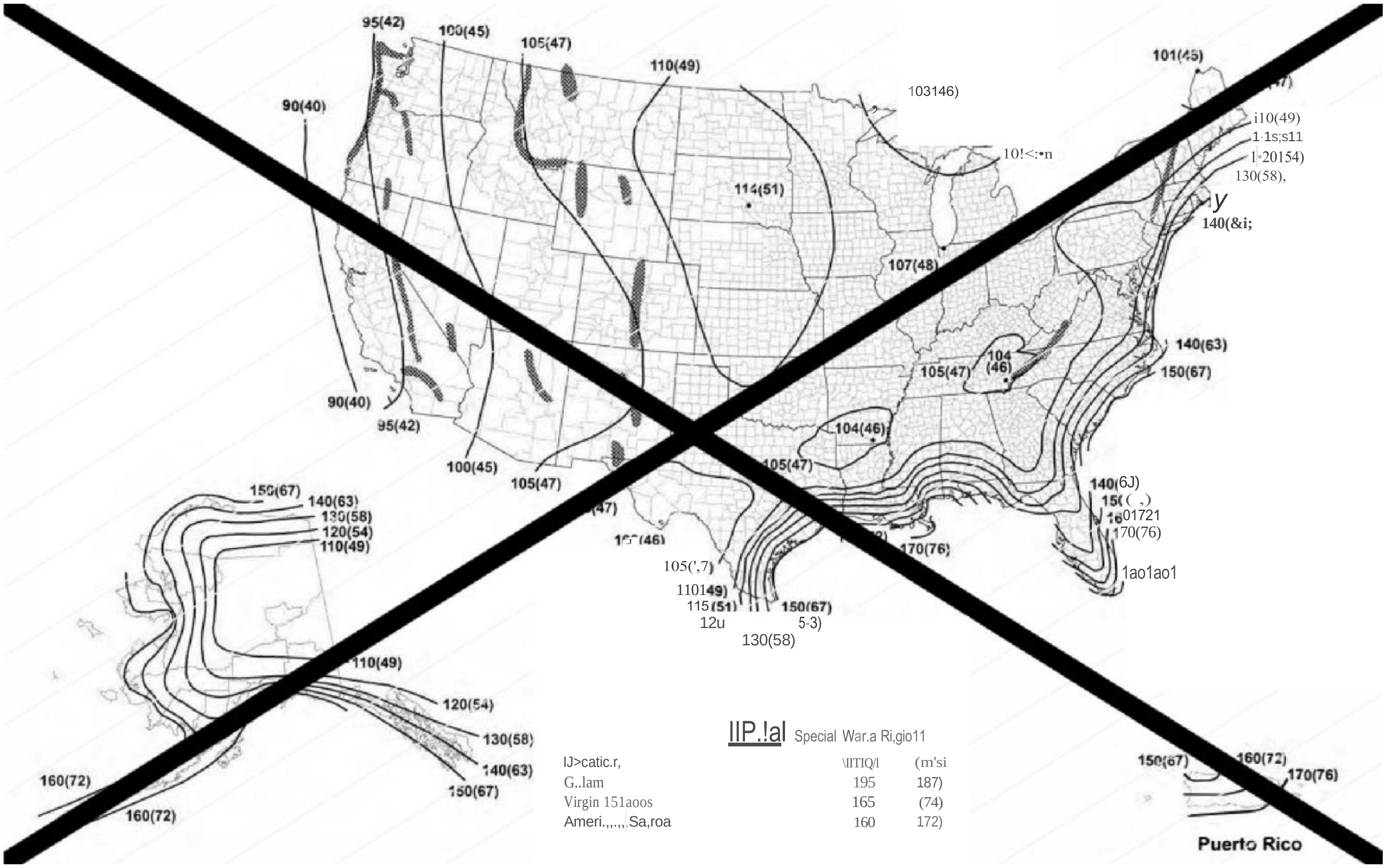
Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4) are basic ~~design~~ wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

1609.3 Basic design wind speed. The basic ~~design~~ *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4). The basic ~~design~~ *wind speed*, *V*, for use in the design of*Risk Category* I ~~II~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(1)~~, 1609.3(5) and 1609.3(6)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of*Risk Category* II ~~III~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(2)~~, 1609.3(7) and 1609.3(8)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* III ~~IV~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(3)~~, 1609.3(9) and 1609.3(10)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of*Risk Category* IV ~~I~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(4)~~, 1609.3(11) and 1609.3(12)~~. Basic *wind speeds* for Hawaii, US Virgin Islands, and Puerto Rico shall be determined by using the ASCE *Wind Design Geodatabase*. The ASCE *Wind Design Geodatabase* is available at https://asce7hazardtool.online, or an approved equivalent.

The basic ~~design~~ *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic ~~design~~ wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.In nonhurricane-prone regions, when the basic ~~design~~ *wind speed*, *V*, is estimated from regional climatic data, the basic design *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.



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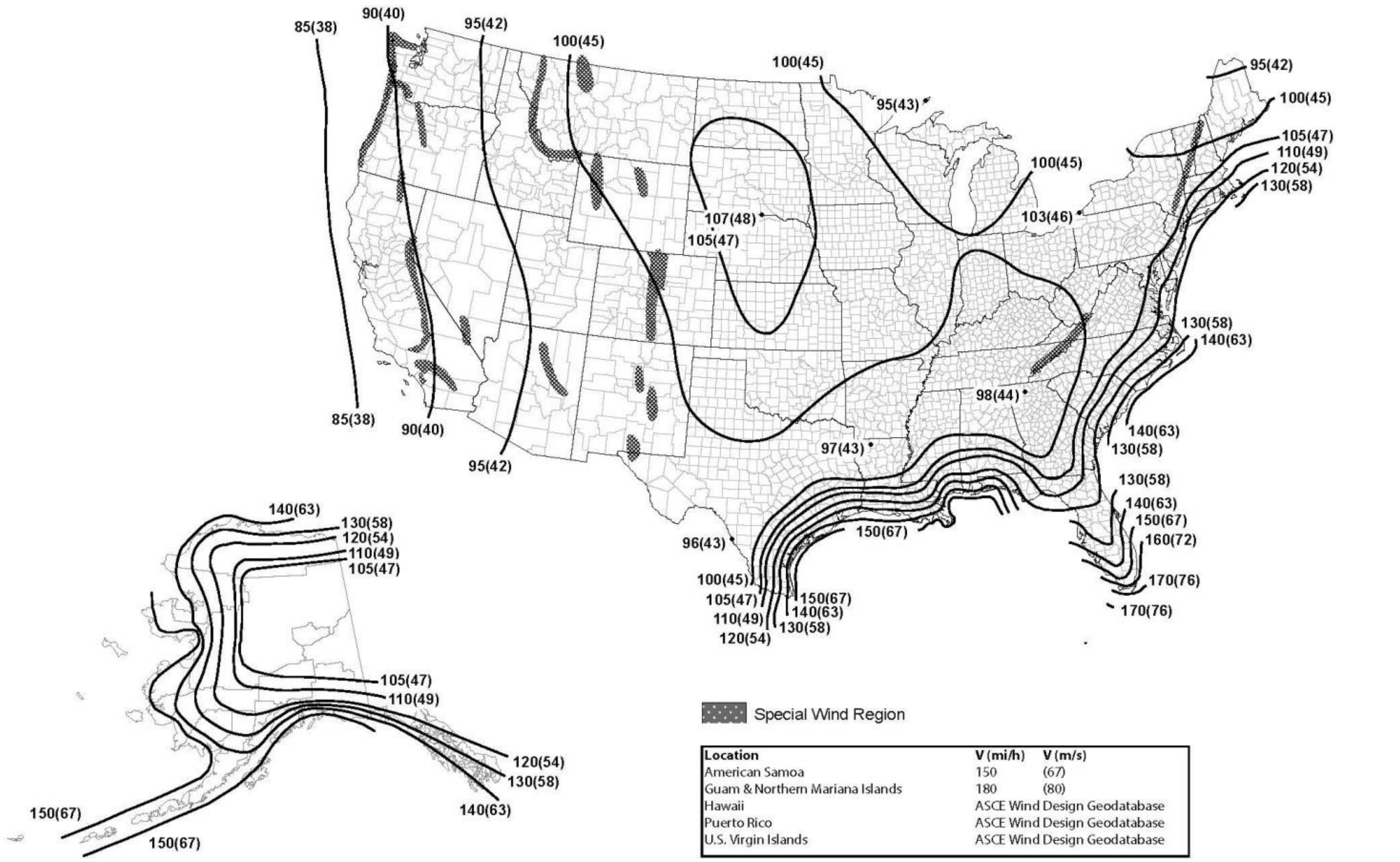
Puerto Rico



~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~

2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation~~.

3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour~~.

4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions~~.

5. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

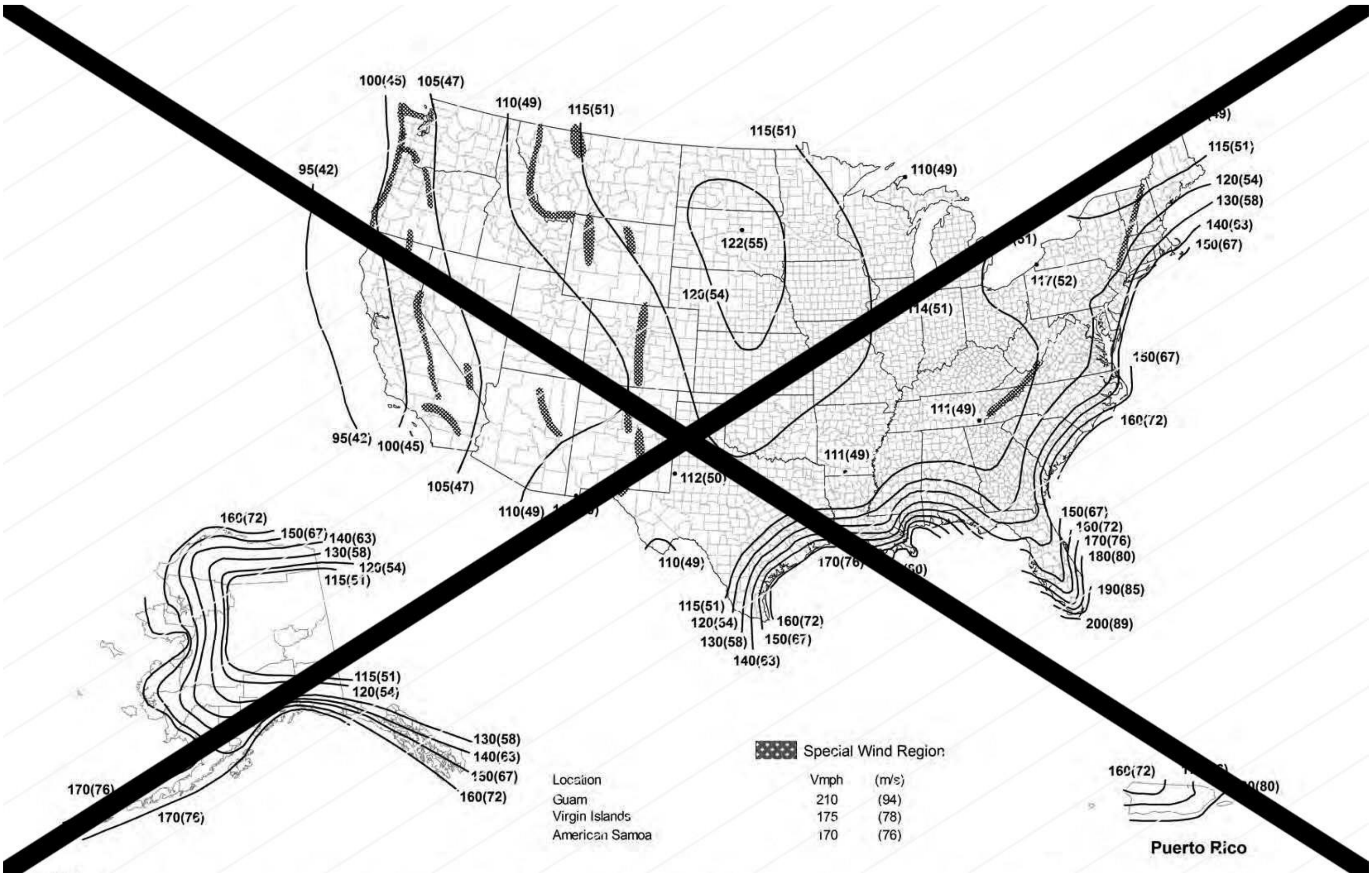
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.

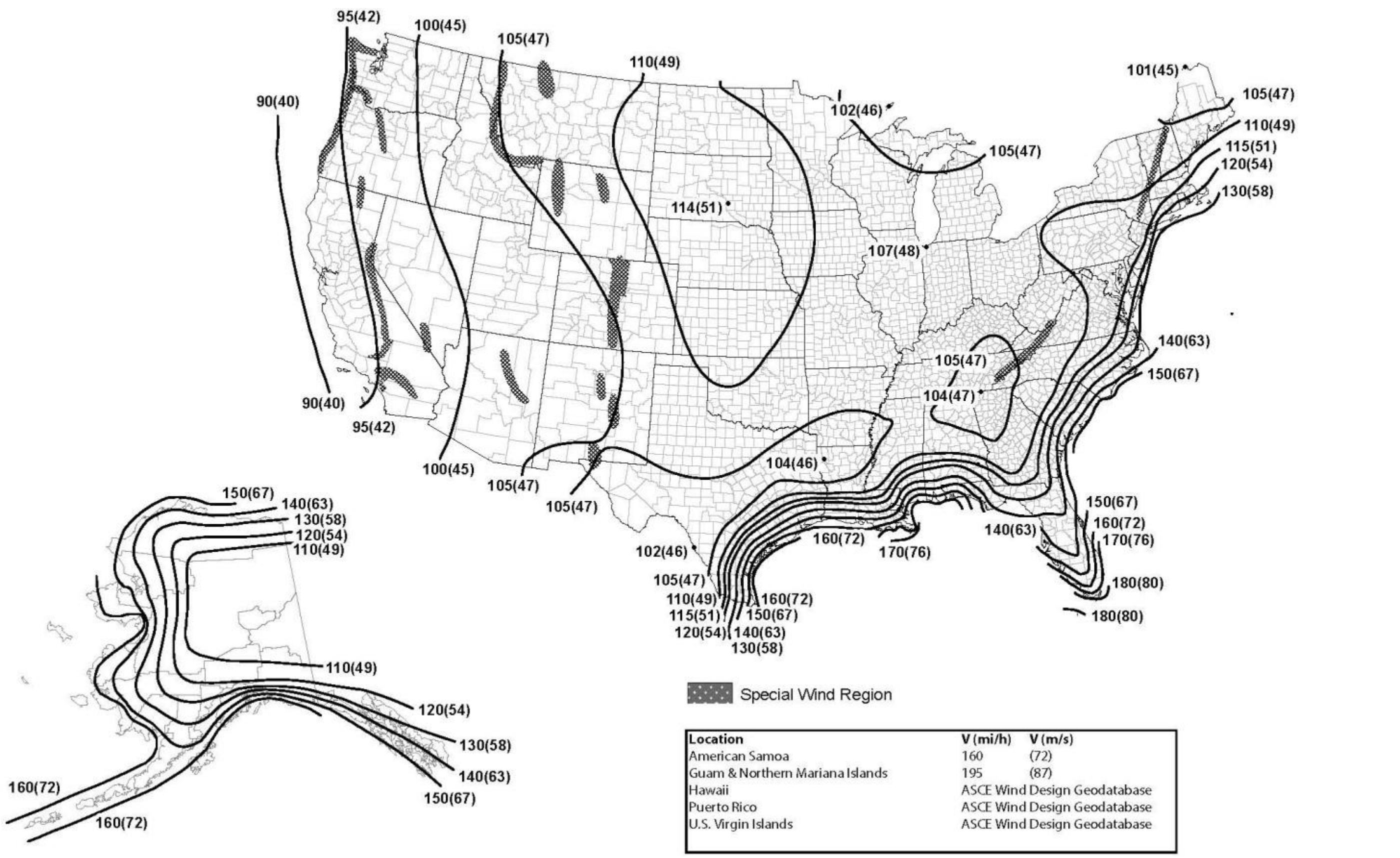
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.

7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00333, MRI = 300 years).

8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(1) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY I ~~II~~ BUILDINGS AND OTHER STRUCTURES





Location	V (mi/h)	V (m/s)
American Samoa	160	(72)
Guam & Northern Mariana Islands	195	(87)
Hawaii	ASCE Wind Design Geodatabase	
Puerto Rico	ASCE Wind Design Geodatabase	
U.S. Virgin Islands	ASCE Wind Design Geodatabase	

Notes:

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation~~.
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour~~.
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions~~.
5. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

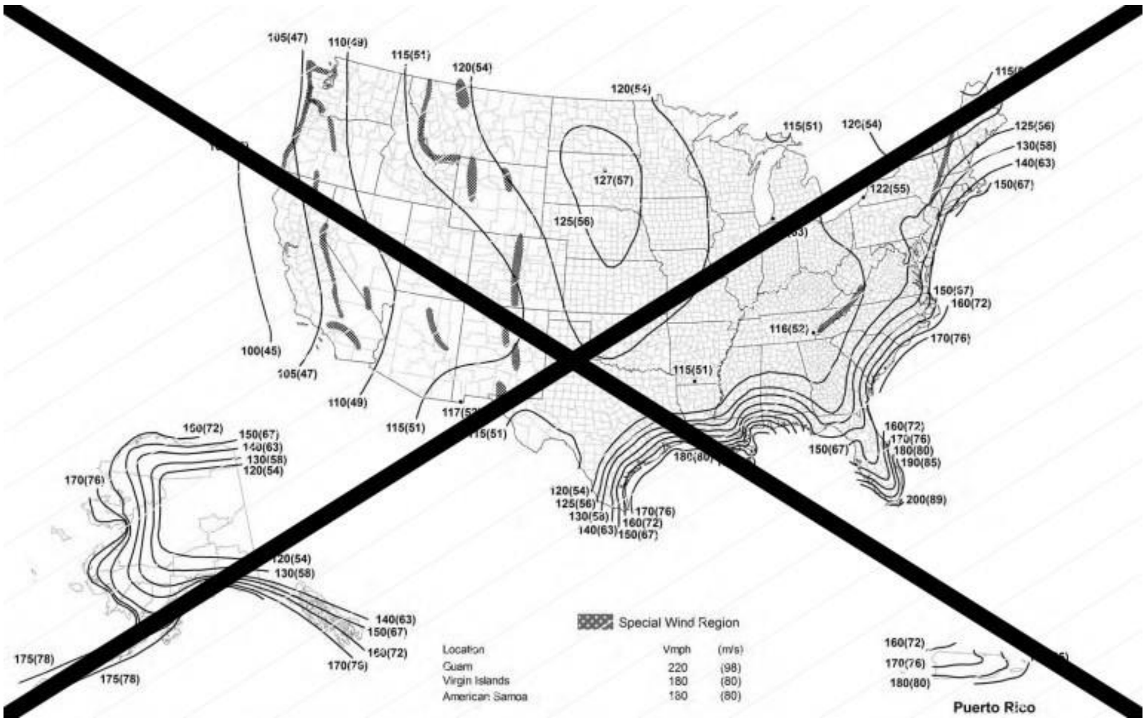
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.

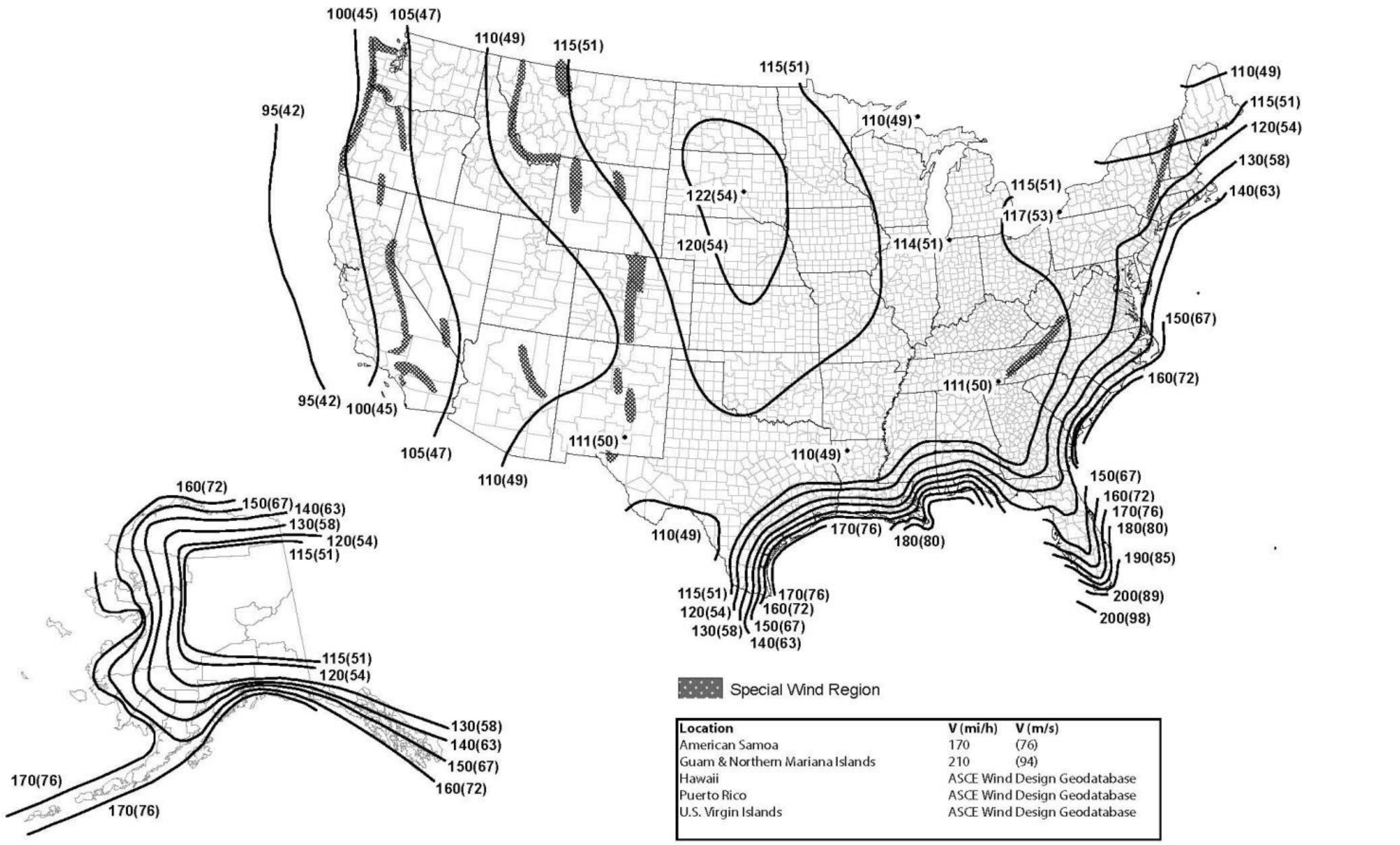
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.

7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).

8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(2) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY II ~~III~~ BUILDINGS AND OTHER STRUCTURES





Notes:

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~

2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation~~.

3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour~~.

4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions~~.

5. ~~Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3000 Years).~~

6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic windspeeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

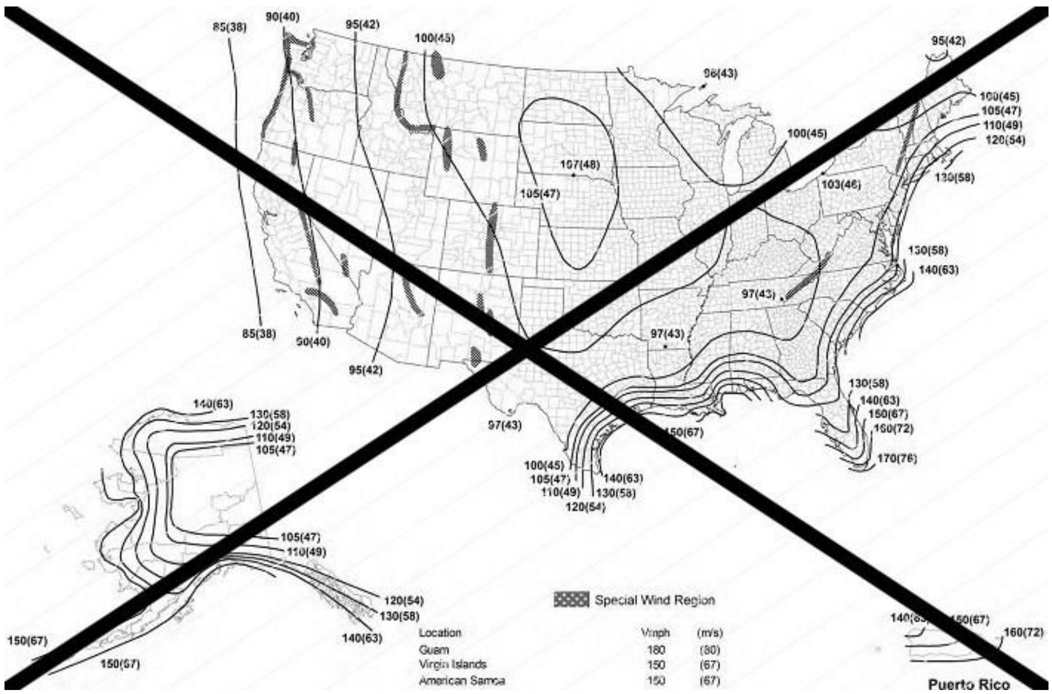
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.

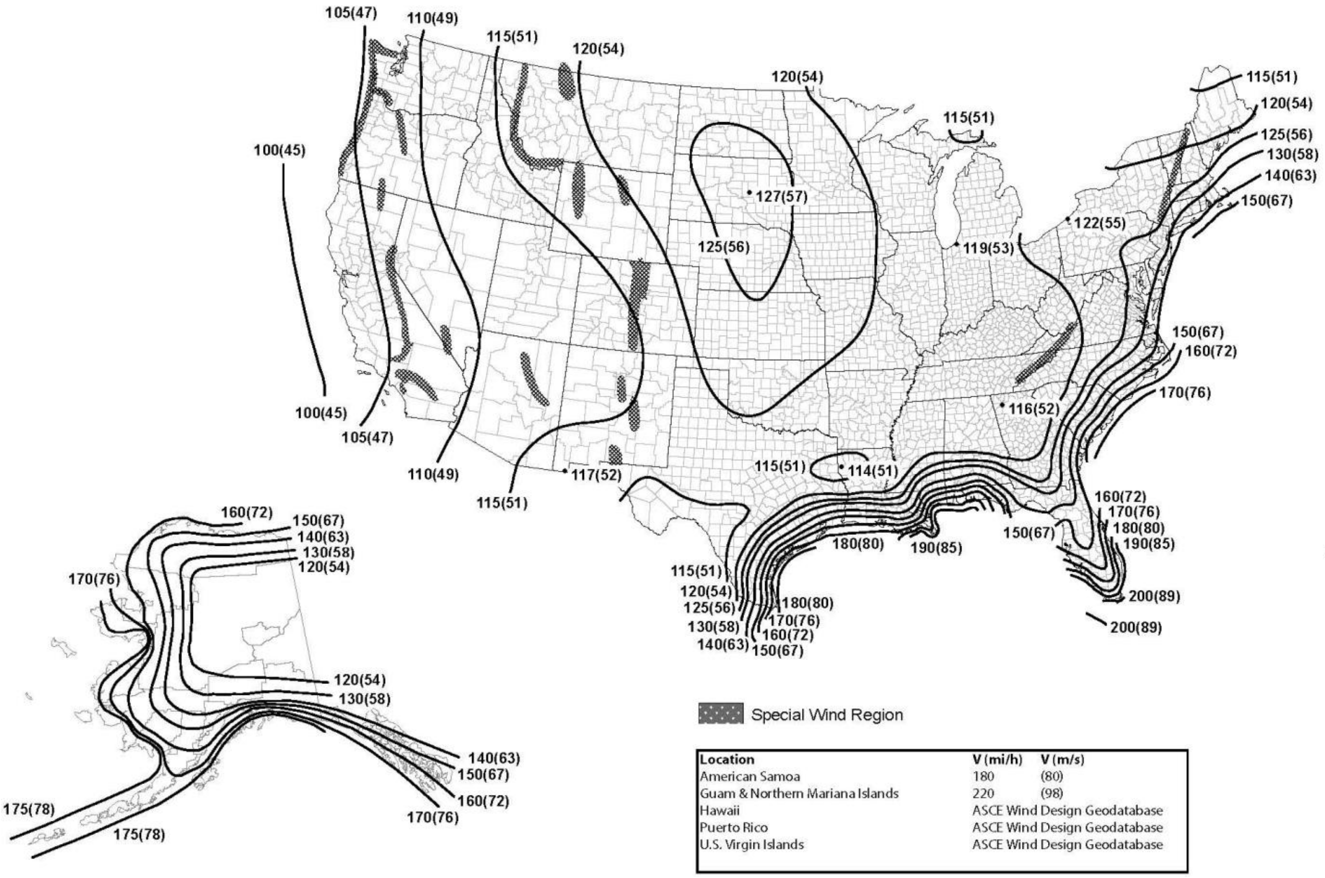
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.

7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.000588, MRI = 1,700 years).

8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(3) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY III ~~IV~~ BUILDINGS AND OTHER STRUCTURES





~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation~~.
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour~~.
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions~~.
5. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00333, MRI = 300 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~.

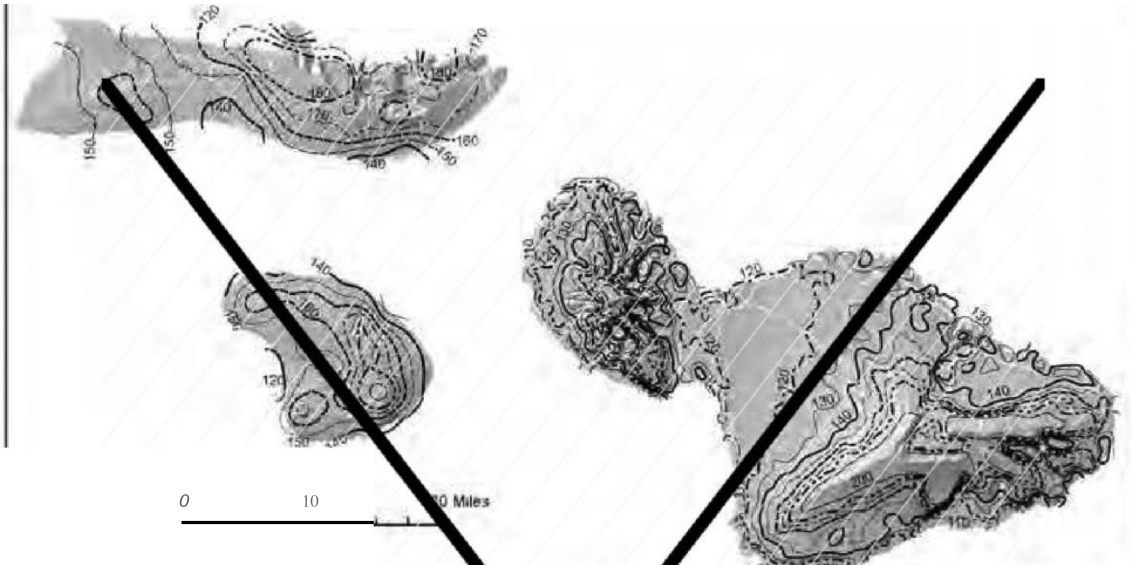
Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3,000 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(4) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY IV ~~I~~ BUILDINGS AND OTHER STRUCTURES

Delete without substitution:



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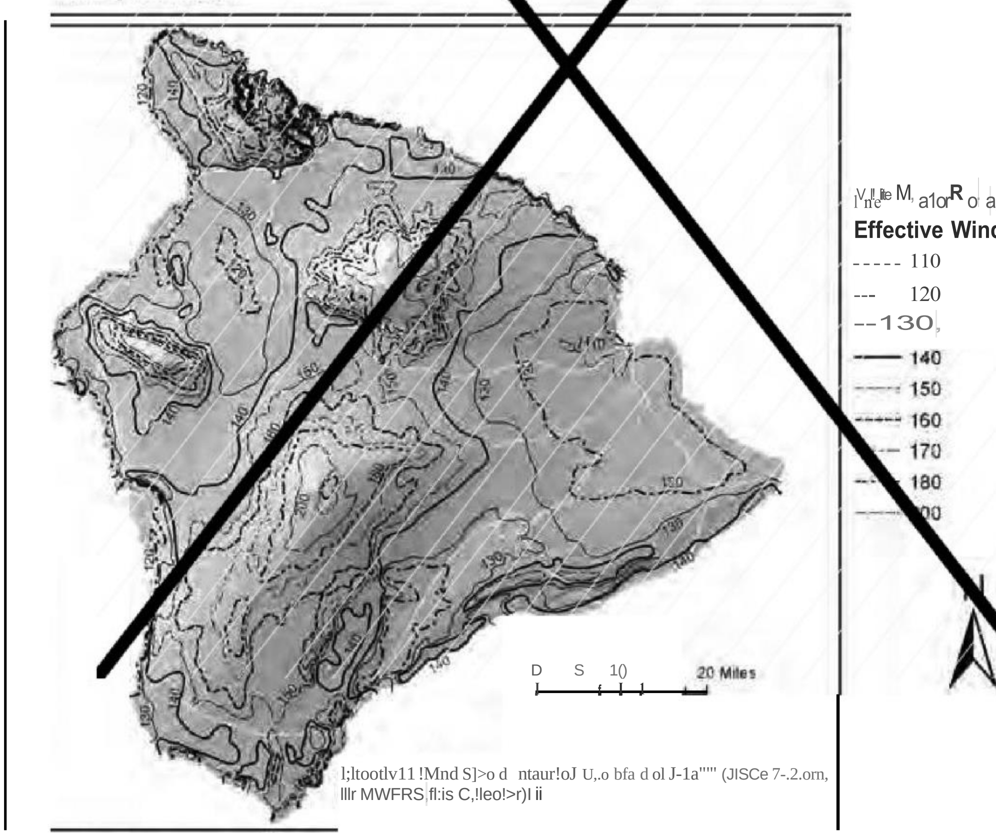

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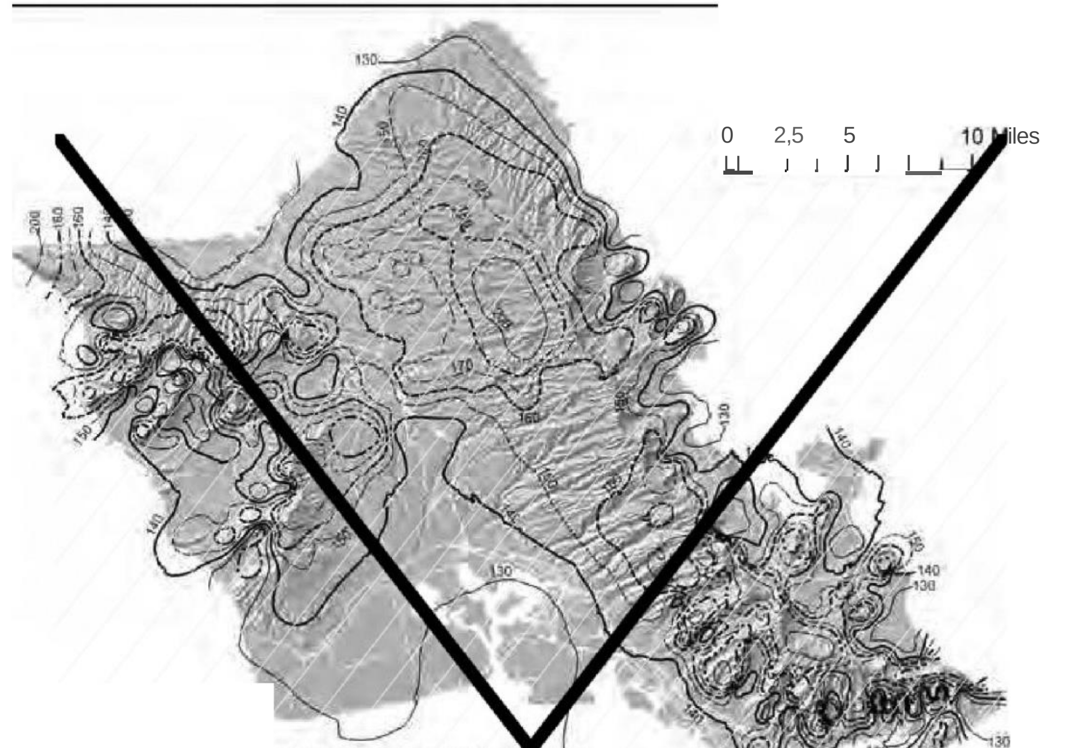
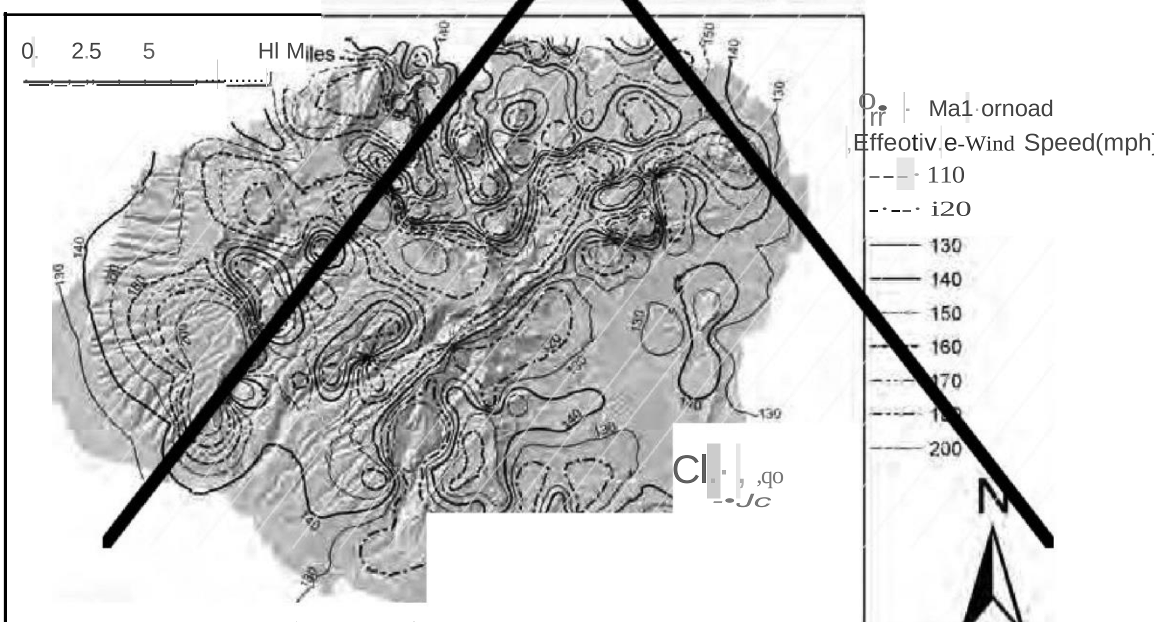
~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of~~ $\cancel{K_{zt}}$ ~~of 1.0 and~~ $\cancel{K_d}$ ~~as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~**FIGURE 1609.3(5) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAI**~~



Effective Wind Speed Contour for the Island of Oahu (ASCE 7-2016)
for MWFRS Risk Category II



Effective Wind Speed Contour for the Island of Kauai (ASCE 7-2016)
for MWFRS Risk Category II

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~

2. ~~Linear interpolation between contours is permitted.~~

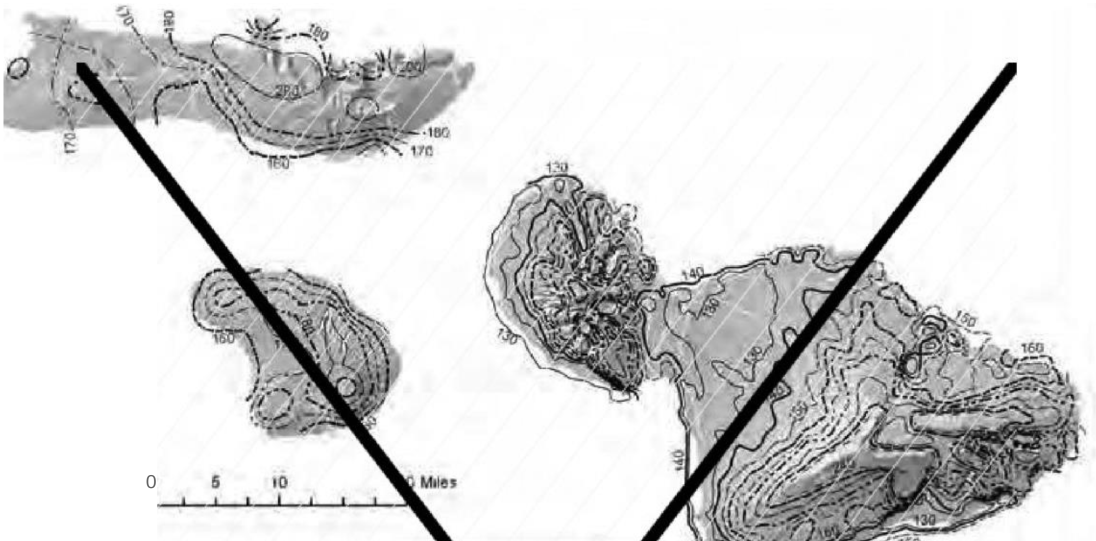
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~

4. ~~It is permitted to use the standard values of~~ $\cancel{K_{zt}}$ ~~of 1.0 and~~ $\cancel{K_d}$ ~~as given in Table 26.6-1 of ASCE 7.~~

5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~**FIGURE 1609.3(6) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)**~~



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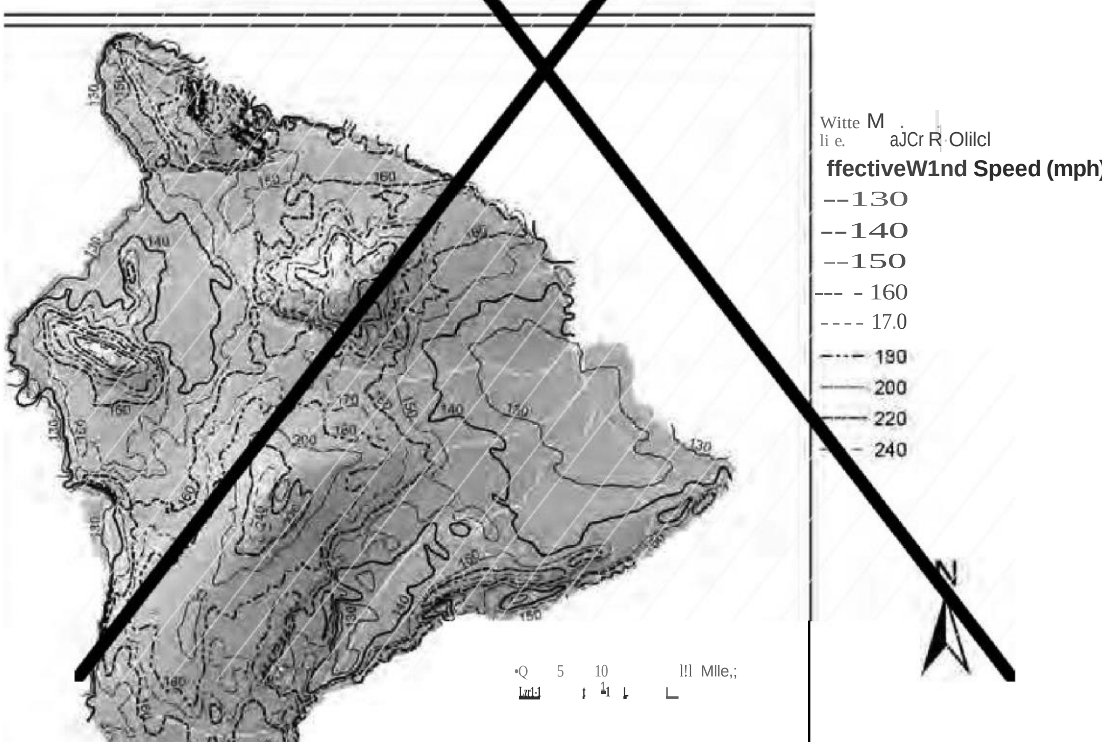

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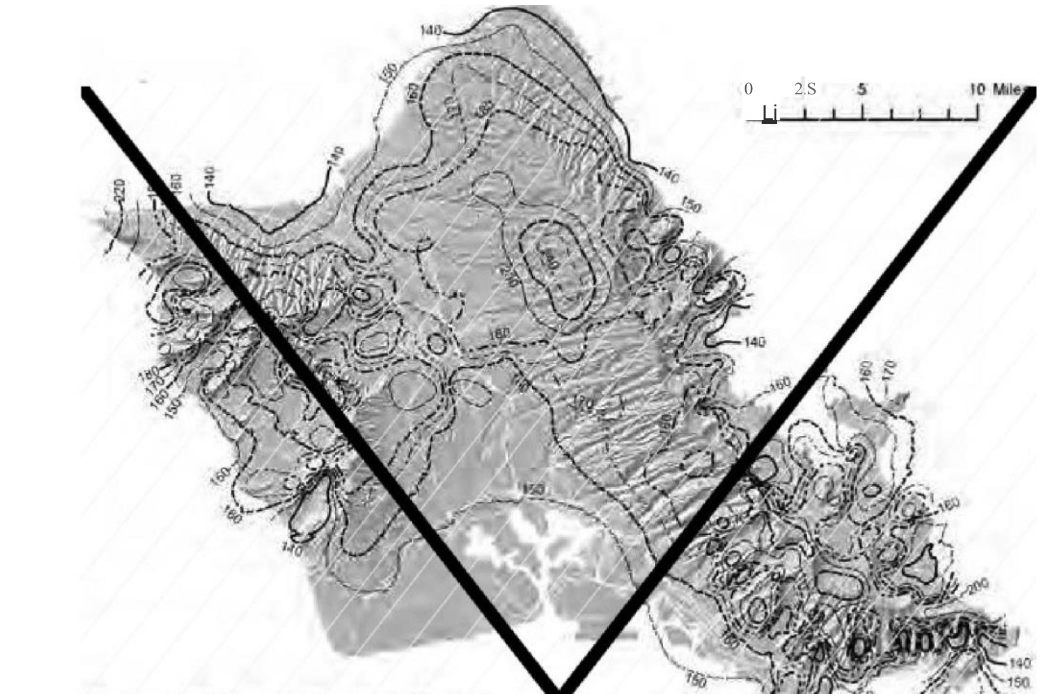
~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

-

~~**FIGURE 1609.3(7) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII**~~



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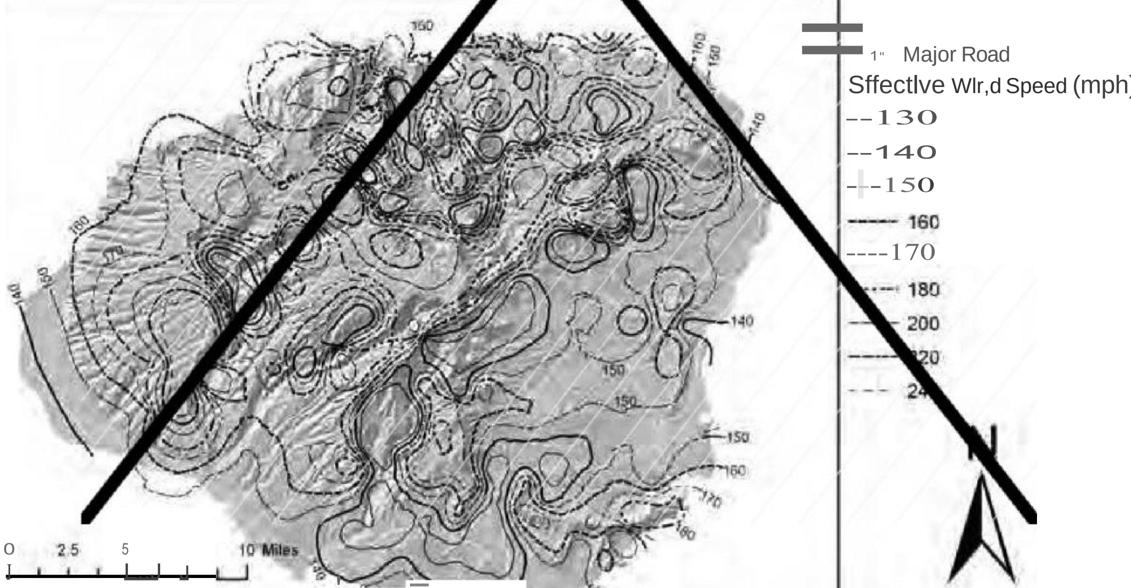

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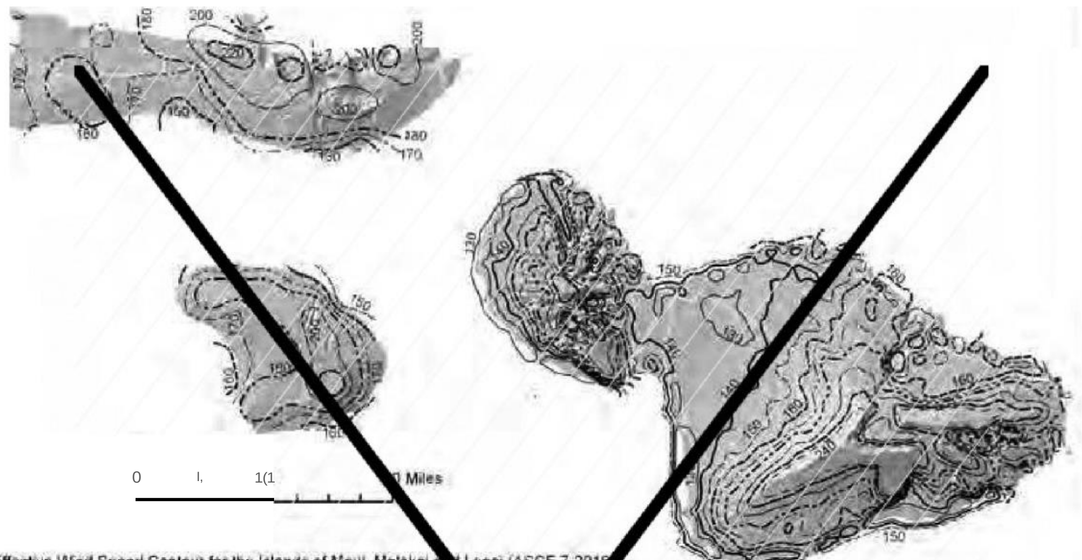
~~**Notes:**~~

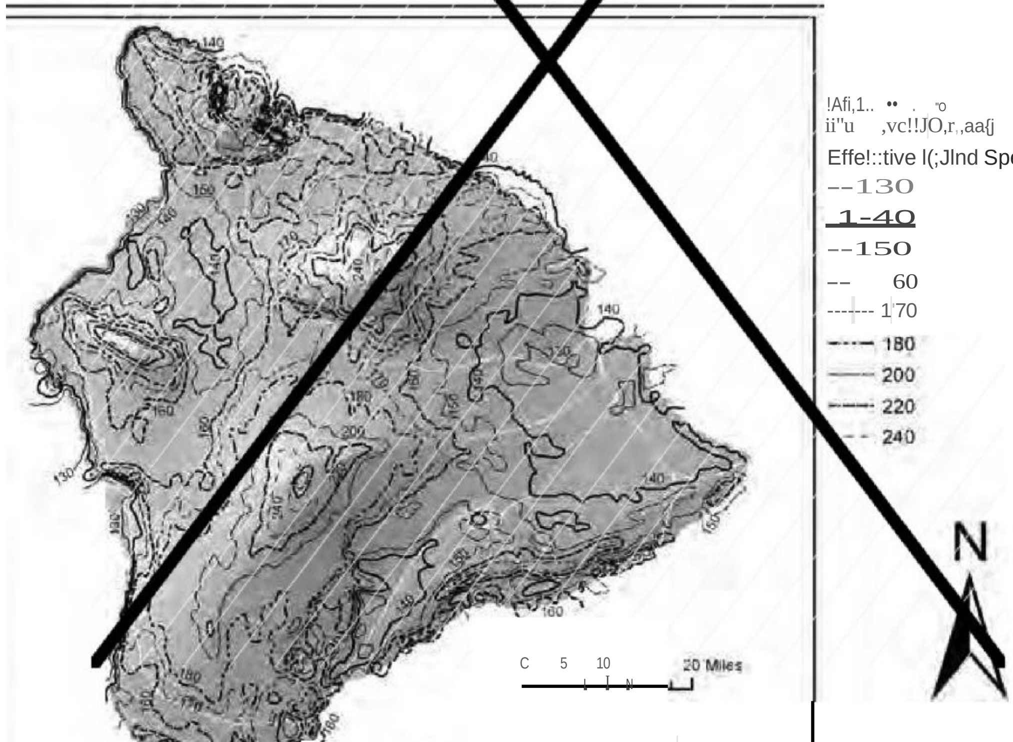
1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

-

~~FIGURE 1609.3(8) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~



Effective Wind Speed Contour for the Islands of Maui, Molokai and Lanai (ASCE 7-2016)
for MWFRS, Risk Category IV



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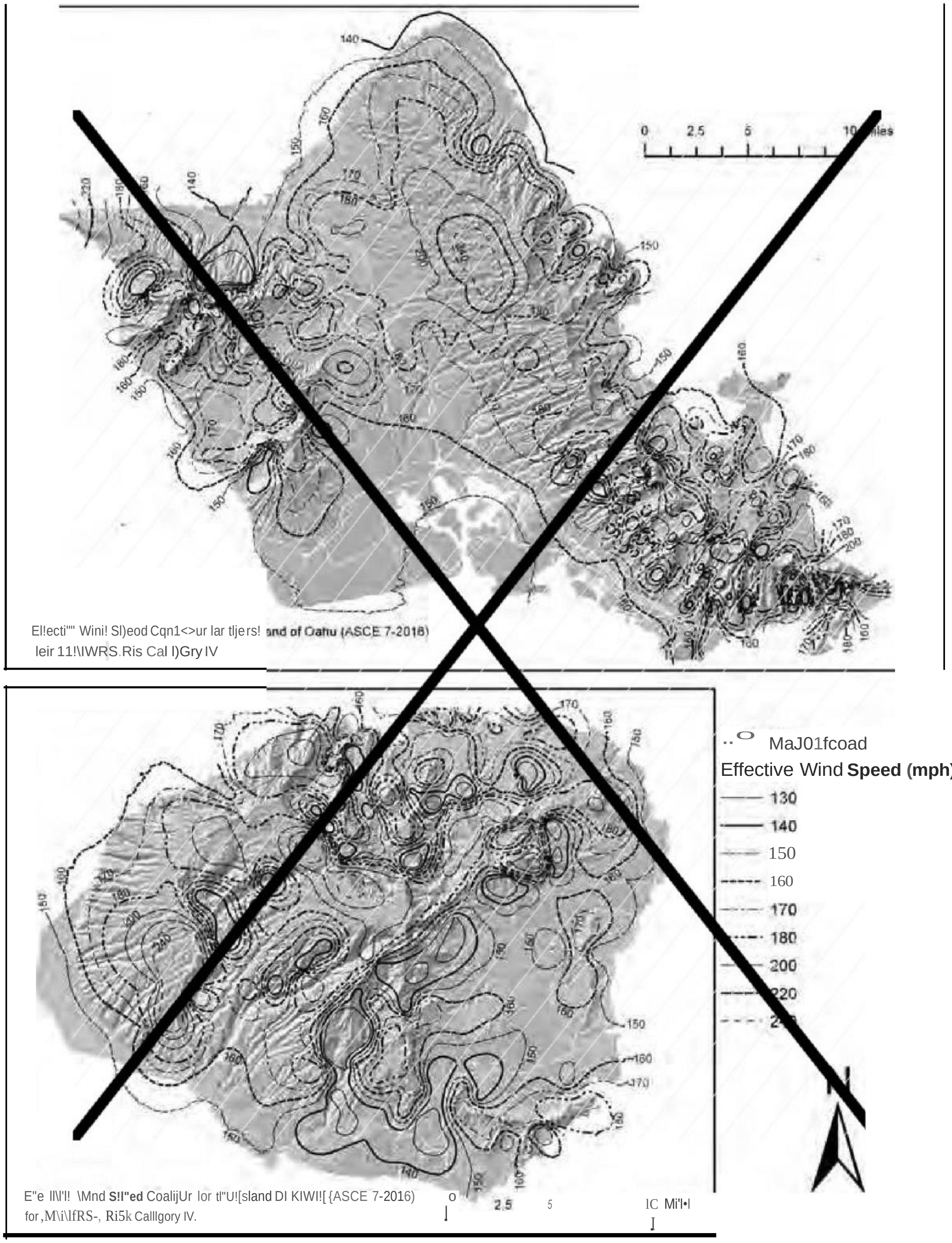
~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of~~ $\cancel{K_{zt}}$ ~~of 1.0 and~~ $\cancel{K_d}$ ~~as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 1.7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

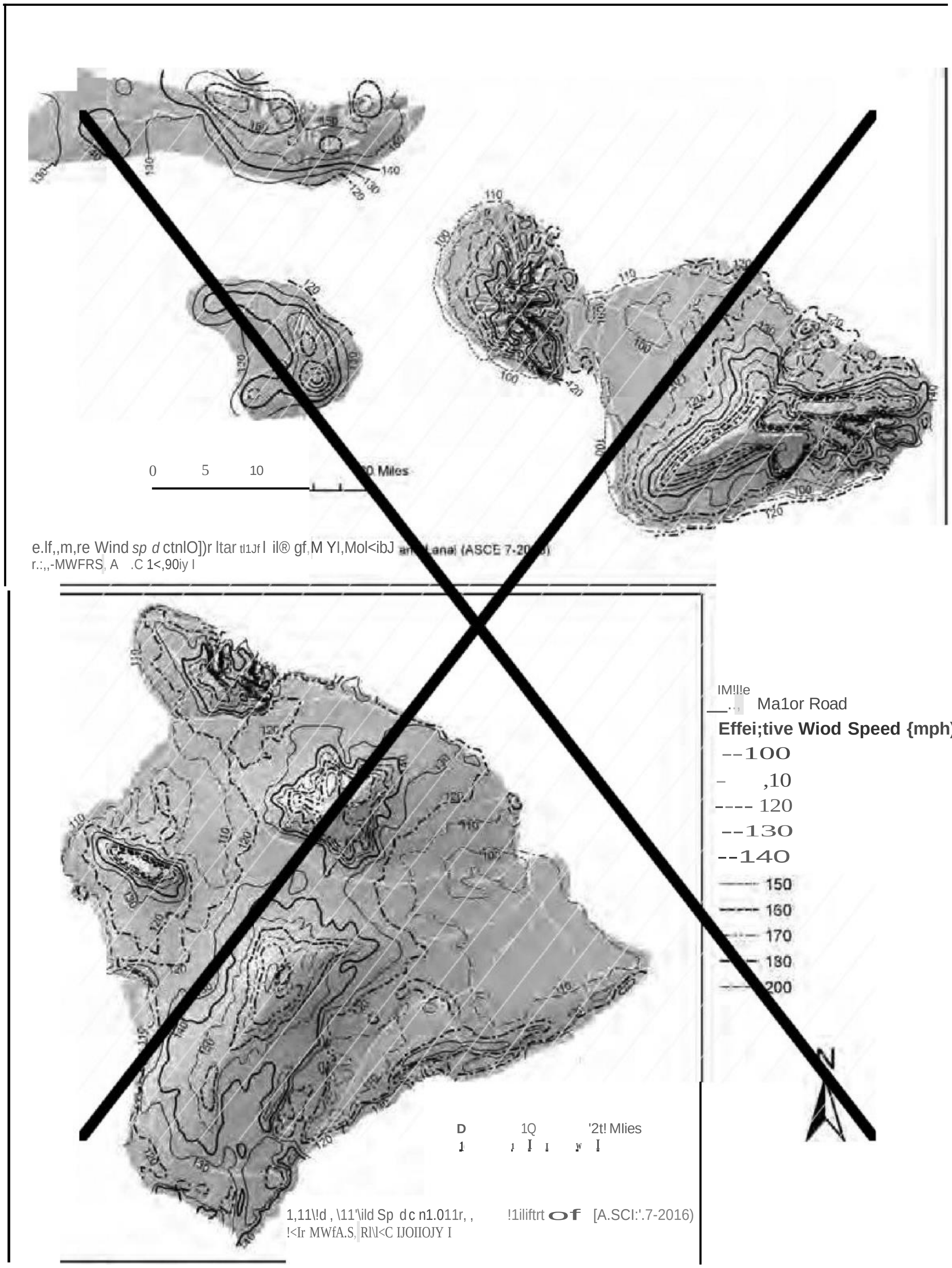
~~**FIGURE 1609.3(9) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII**~~


0 2.5 5 10 Miles
and of Oahu (ASCE 7-2016)
Effective Wind Speed (mph)
130
140
150
160
170
180
200
220
(ASCE 7-2016)
2.5
5

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of~~ $\cancel{K_{zt}}$ ~~of 1.0 and~~ $\cancel{K_d}$ ~~as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 1.7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~**FIGURE 1609.3(10) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)**~~



Major Road
Effective Wind Speed (mph)
100
120
130
140
150
160
170
180
200
N

~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~

2. ~~Linear interpolation between contours is permitted.~~

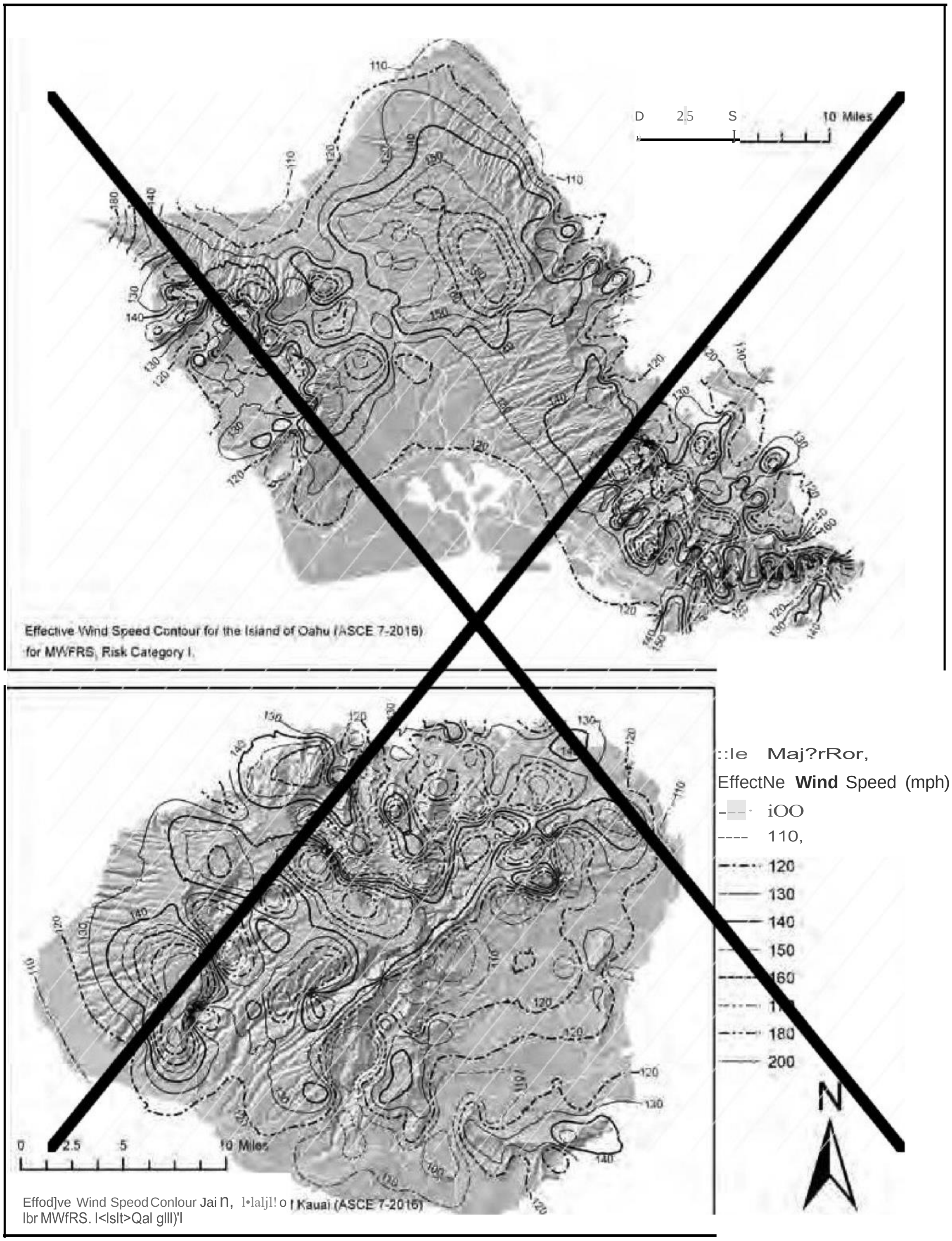
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~

4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~

5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

6. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(11) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII~~



Effective Wind Speed Contour for the Island of Oahu (ASCE 7-2016) for MWFRS, Risk Category I.

Effod]ve Wind Speed Conlour Jai n, l•laljl! o f Kauai (ASCE 7-2016) lbr MWfRS. I<lslt>Qal glll)'I

~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_d as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(12) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

Revise as follows:

1609.3.1 Wind speed conversion. Where required, the basic ~~design~~ wind speeds of Figures 1609.3(1) through 1609.3~~(12)~~ (4) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6}$$ **(Equation 16-17)**

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4).

TABLE 1609.3.1 WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.

c. V = basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4).

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of *ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal includes technical updates as well as editorial corrections or re-organizations. Technical updates to the wind speed maps within ASCE/SEI 7-22 include new hurricane coastline wind speed contours from the Carolina's through Texas, as well as, new Special Wind Region definitions in Southern California and Northern Colorado. All of these updates are based upon recent wind studies conducted in these areas. These wind speeds for the contiguous United States and Alaska are available from the maps in ASCE 7-22, which are updated in Section 1609 of this proposal.

Along with the continental United States, the wind speeds for US Virgin Island and Puerto Rico were also updated based upon recent wind studies of these islands. The resulting wind speeds accounting for the steep terrain of these island created a very dense contour map that is not easily read by a map that is sized practically for inclusion into a printed standard. Therefore the the wind speeds for US Virgin Islands and Puerto Rico - along with wind speeds for Hawaii - are only included in the ASCE Wind Design Geodatabase and therefore are no longer represented with maps in ASCE/SEI 7-22. Consequently, Hawaii and Puerto Rico maps - as well as values for US Virgin Islands - are being removed from the IBC and replaced with a pointer to the ASCE Wind Design Geodatabase. The wind speeds within the updated Special Wind Regions also are available for the designer ASCE Wind Design Geodatabase. This database of geocoded wind speed design data is freely available and accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/, or from an approved equivalent.

A summary of the coordination changes is provided below.

Section 202 DEFINITIONS:

Windborne Debris Region: Corrections to this definition for correct term of "basic*wind speed*" deleting the outdated inclusion of "design" in the term. Also reorganized Risk Category order and correct pointers to the updated maps. No technical changes.

Wind Design Geodatabase: Adding a new definition for the database that contains the windspeeds from ASCE 7-22. The database is the 2022-1.0 version and is freely available at https://asce7hazardtool.online/.

Table 1504.2: Updates the pointer to the maps in 1609.3(1)-(4).

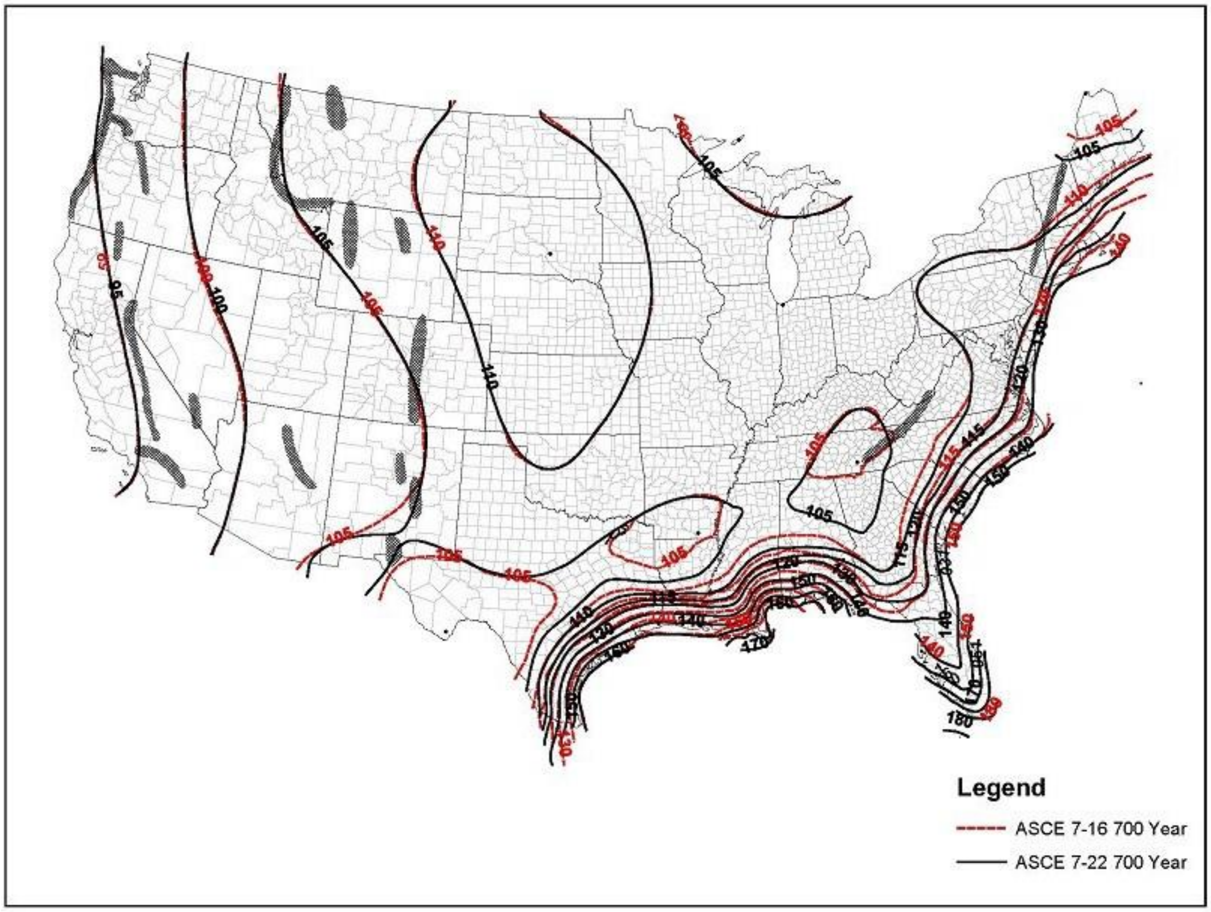
1504.6 Edge systems for low-slope roofs. Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1602.1 Notations: Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1609.1.1Determination of wind loads: Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1609.3 Basic design wind speed: This section updates all of the basic wind speed maps for the contiguous United States and Alaska, as well as the Notes, to match what is in ASCE/SEI 7-22. It also includes the updates to the pointers for the maps. Additionally, the order of the maps has been revised. The maps now begin with Risk Category I and progress to Risk Category IV. The pointer to the ASCE Wind Design Geodatabase is added for Hawaii, US Virgin Islands, and Puerto Rico, and because maps for these three areas are no longer produced in ASCE/SEI 7-22, the maps have been removed from the IBC and are not replaced.

1609.3.1 Wind speed conversion and **Table 1609.3.1:** Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.



Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the wind speeds for ASCE 7-22 largely remain unchanged, therefore the is no impact to the cost of construction from the updated maps. However, in some areas the wind speeds decrease and in other areas the wind speeds increase. The proposed code change will modestly increase the cost of construction along in some areas along the hurricane coastline between the Carolinas and Texas where the windspeeds have increased.

Although the wind speeds do increase in some locations along the hurricane coastline, the higher wind speeds influence less than 3% of the United States. The wind speeds decrease in most areas along the hurricane coastline (as shown by the wind speed contours moving closer to the coastline), while in the Gulf Coast area of the Florida Panhandle the contours extend further inland, which indicates higher wind speeds for this area. And most of the rest of the continental United States the speeds do not change and therefore the cost of construction will be unchanged; see the Risk Category II map below that compared ASCE 7-22 to ASCE 7-16. ASCE 7 Wind speeds are available at the ASCE 7 Hazard Tool (https://asce7hazardtool.online/), which is free to all users, to view and compare various locations.

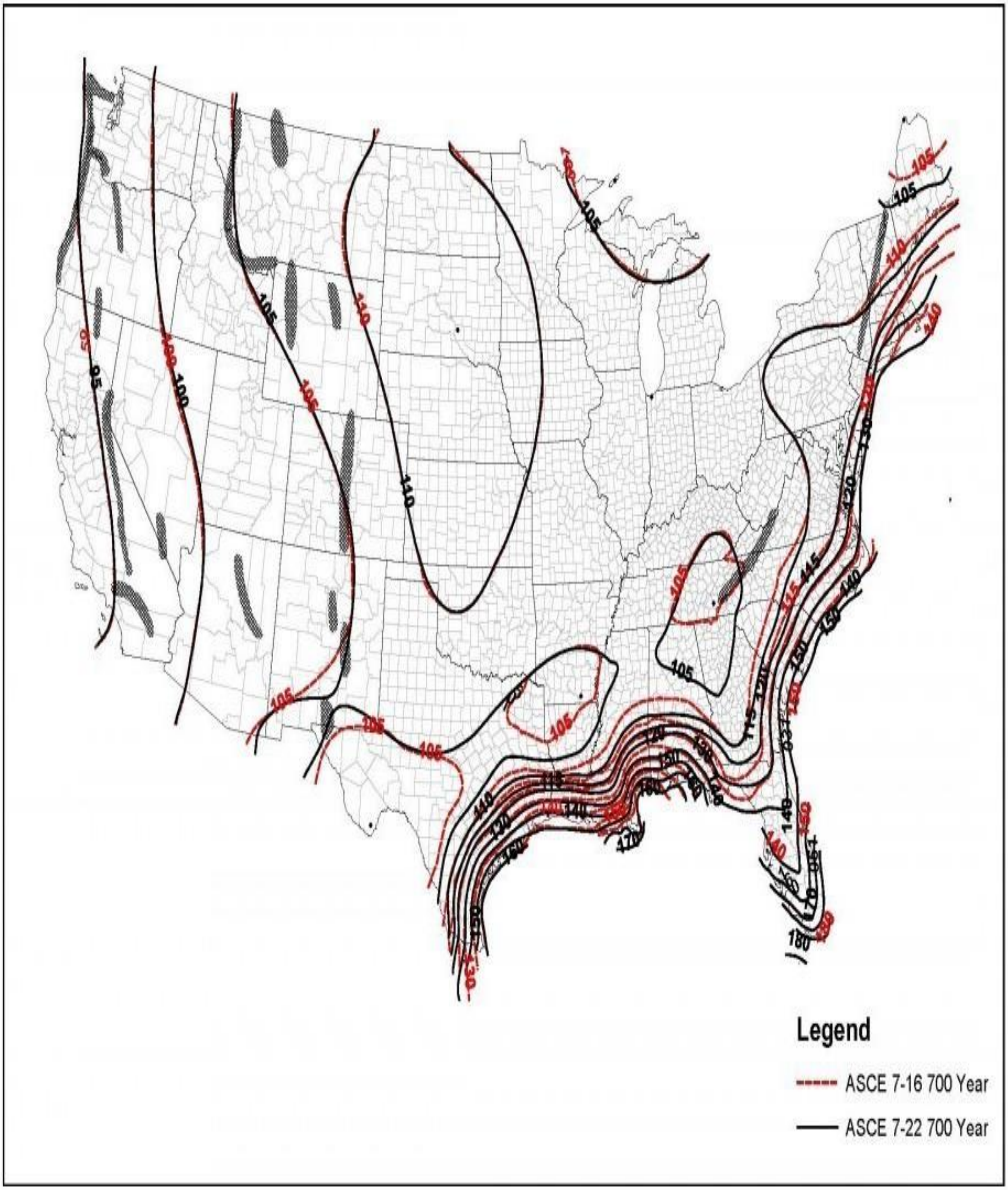


FIGURE: Comparison of ASCE/SEI 7-22 basic wind speeds for Risk Category II (700 Year MRI) to ASCE/SEI 7-16. (Courtesy ARA)

All of the other proposed changes are editorial and will not impact the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: Figure 1609.3(2): Notes: 7. Wind speeds correspond to approximately a ~~15%~~ 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).
Figure 1609.3(3): Notes: 7. Wind speeds correspond to approximately a ~~15%~~ 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.000588, MRI = 1,700 years).

Figure 1609.3(4): Notes: 7. Wind speeds correspond to approximately a ~~15%~~ 1.6% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3,000 years).

Committee Reason: Approved as modified as per the provided reason statement. The modification corrects the probability of exceedance percentages in the Figures notes. (Vote: 14-0)

Final Hearing Results

S62-22 AM

S63-22

Original Proposal

IBC: CHAPTER 2, SECTION 202, CHAPTER 16, SECTION 1602, 1602.1, SECTION 1603, 1603.1.4, SECTION 1605, 1605.1, SECTION 1607, 1607.14, 1607.14.3, SECTION 1609, 1609.5 (New), 1609.5, 1609.5.1, 1609.5.2, 1609.6.3 (New), 1609.5.3, 1609.6.3.2 (New), CHAPTER 23, SECTION 2308, 2308.2.3, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Marc Levitan, National Institute of Standards and Technology, NIST (marc.levitan@nist.gov); Pataya Scott, Federal Emergency Management Agency (pataya.scott@fema.dhs.gov)

2021 International Building Code

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

Revise as follows:

[BS] NOMINAL LOADS. The magnitudes of the *loads* specified in Chapter 16 (dead, live, soil, wind, <u>tornado,</u> snow, rain, *flood* and earthquake).

[BS] ESSENTIAL FACILITIES. Buildings and other structures that are intended to remain operational in the event of extreme environmental loading from *flood*, wind, <u>tornadoes,</u> snow or earthquakes.

[BS] RISK CATEGORY. A categorization of buildings and *other structures* for determination of *flood*, wind, <u>tornado,</u> snow, ice and earthquake *loads* based on the risk associated with unacceptable performance.

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1602 NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.

T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.
V	=	Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
V_T *W*	= =	Tornado speed, miles per hour (mph) (m/s) determined from Chapter 32 of ASCE 7. Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1603
CONSTRUCTION DOCUMENTS

Revise as follows:

1603.1.4 Wind and tornado design data. The following information related to wind and tornado *loads* shall be shown, regardless of whether wind or tornado *loads* govern the design of the lateral force-resisting system of the structure:

1. Basic ~~design~~ *wind speed*, *V* (mph), tornado speed, V_T (mph), ~~miles per hour~~ and *allowable stress design wind speed*, V_{asd} (mph), as determined in accordance with Section 1609.3.1.

2. *Risk category*.

3. Effective plan area, A_e, for tornado design in accordance with Chapter 32 of ASCE 7.

~~3.~~ 4. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.

~~4.~~ 5. Applicable internal pressure coefficients, and applicable tornado internal pressure coefficients.

~~5.~~ 6. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, pounds per square foot (kN/m^2). Where design for tornado loads is required, the design pressures shown shall be the maximum of wind or tornado pressures.

SECTION 1605
LOAD COMBINATIONS

Revise as follows:

1605.1 General. Buildings and *other structures* and portions thereof shall be designed to resist the strength load combinations specified in ASCE 7, Section 2.3, the a*llowable stress design* load combinations specified in ASCE 7, Section 2.4, or the alternative a*llowable stress design* load combinations of Section 1605.2.

Exceptions:

1. The modifications to load combinations of ASCE 7 Section 2.3, ASCE 7 Section 2.4, and Section 1605.2 specified in ASCE 7 Chapters 18 and 19 shall apply.
2. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, flat roof snow*loads* of 30 pounds per square foot (1.44 kN/m^2) and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic load. Where flat roof snow *loads* exceed 30 pounds per square foot (1.44 kN/m^2), 20 percent shall be combined with seismic loads.
3. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, crane hook loads need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind loads.
4. Where tornado loads are required, the alternative*allowable stress design* load combinations of Section 1605.2 shall not apply when tornado loads govern the design.

SECTION 1607
LIVE LOADS

Revise as follows:

1607.14 Roof loads. The structural supports of roofs and *marquees* shall be designed to resist wind and, where applicable, tornado and snow and earthquake *loads*, in addition to the *dead load* of construction and the appropriate *live loads* as prescribed in this section, or as set forth in Table 1607.1. The *live loads* acting on a sloping surface shall be assumed to act vertically on the horizontal projection of that surface.

1607.14.3 Awnings and canopies. *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 as well as for snow *loads* and wind and tornado *loads* as specified in Sections 1608 and 1609.

SECTION 1609
WIND LOADS

Add new text as follows:

1609.5 Tornado Loads. The design and construction of *Risk Category* III and IV buildings and *other structures* located in the tornado-prone region as shown in Figure 1609.5 shall be in accordance with Chapter 32 of ASCE 7, except as modified by this code.

FIGURE 1609.5 TORNADO-PRONE REGION

Revise as follows:

~~1609.5~~ 1609.6 Roof systems. Roof systems shall be designed and constructed in accordance with Sections ~~1609.5.1~~ 1609.6.1 through ~~1609.5.3~~, 1609.6.3 as applicable.

~~1609.5.1~~ 1609.6.1 Roof deck. The *roof deck* shall be designed to withstand the greater of wind pressures or tornado pressures determined in accordance with ASCE 7.

~~1609.5.2~~ 1609.6.2 Roof coverings. *Roof coverings* shall comply with Section ~~1609.5.1~~ 1609.6.1.

> **Exception:** Rigid tile *roof coverings* that are air permeable and installed over a *roof deck* complying with Section ~~1609.5.1~~ 1609.6.1 are permitted to be designed in accordance with Section 1609.~~5~~6.3.

Asphalt shingles installed over a *roof deck* complying with Section ~~1609.5.1~~ 1609.6.1 shall comply with the wind-resistance requirements of Section 1504.2 .

Add new text as follows:

1609.6.3 Rigid Tile . Wind and tornado loads on rigid tiles shall comply with Sections 1609.6.3.1 or 1609.6.3.2, as applicable.

Revise as follows:

~~**1609.5.3**~~ **1609.6.3.1** ~~**Rigid tile**~~ **Wind loads.** Wind *loads* on rigid tile *roof coverings* shall be determined in accordance with the following equation:

$$M_a = q_h C_L b L L_a [1.0 - GC_p] \qquad \textbf{(Equation 16-18)}$$

For SI: $M_a = \frac{q_h C_L b L L_a [1.0 - GC_p]}{1{,}000}$

where:

b = Exposed width, feet (mm) of the roof tile.

C_L = Lift coefficient. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1504.3.1.

GC_p = Roof pressure coefficient for each applicable roof zone determined from Chapter 30 of ASCE 7. Roof coefficients shall not be adjusted for internal pressure.

L = Length, feet (mm) of the roof tile.

L_a = Moment arm, feet (mm) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76L from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck application or as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.

M_a = Aerodynamic uplift moment, feet-pounds (N-mm) acting to raise the tail of the tile.

q_h = Wind velocity pressure, psf (kN/m^2) determined from Section 26.10.2 of ASCE 7.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the aerodynamic uplift moment as determined by this section.

1. The roof tiles shall be either loose laid on battens, mechanically fastened, *mortar* set or adhesive set.
2. The roof tiles shall be installed on solid sheathing that has been designed as components and cladding.
3. An *underlayment* shall be installed in accordance with Chapter 15.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than 2 inches (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 mm and 533 mm).
6. The exposed width of the tile shall be between 0.67 and 1.25 feet (204 mm and 381 mm).
7. The maximum thickness of the tail of the tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using *mortar* set or adhesive set systems shall have not less than two-thirds of the tile's area free of *mortar* or adhesive contact.

Add new text as follows:

1609.6.3.2 Tornado Loads. Tornado loads on rigid tile roof coverings shall be determined in accordance with Section 1609.6.3.1, replacing q_h with q_{hT} and (GC_p) with $K_{vT}(GC_p)$ in Equation 16-18, where:

q_{hT} = tornado velocity pressure, psf (kN/m^2) determined in accordance with Section 32.10 of ASCE 7.

K_{vT} = tornado pressure coefficient adjustment factor for vertical winds, determined in accordance with Section 32.14 of ASCE 7.

CHAPTER 23 WOOD

SECTION 2308
CONVENTIONAL LIGHT-FRAME CONSTRUCTION

Revise as follows:

2308.2.3 Allowable loads. *Loads* shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average *dead loads* shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, *exterior walls*, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section 2308.6.10, stone or masonry *veneer* up to the less of 5 inches (127 mm) thick or 50 pounds per square foot (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2439) permitted for *gable* ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. *Live loads* shall not exceed 40 psf (1916 N/m^2) for floors.

   Exception: *Live loads* for concrete slab-on-ground floors in *Risk Categories* I and II shall be not more than 125 psf.

3. Ground snow *loads* shall not exceed 50 psf (2395 N/m^2).
4. <u>Tornado loads on the main wind force resisting system and all components and cladding shall not exceed the corresponding wind loads on these same elements</u>

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

<u>7-22</u> <u>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</u>

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial coordination. The specific changes to each section included in this proposal is outlined below, and a detailed summary of the technical updates are explained below that:

Section 202 Definitions: Updates to **Nominal Loads**, **Essential Facilities**, and **Risk Category** to include tornadoes.

Section 1602.1 Notations: Add new term V_T for tornado speeds.

Section 1603.1.4 Wind design data: Modifies section to include tornado speed and applicable internal pressures to be included on the construction drawings.

Section 1605.1 General: Adds new Exception 4 to exclude the use of the Alternative allowable stress design load combinations in Section 1605.2 when tornado loads govern the design.

Section 1607.14 Roof loads; Section 1607.14.3 Awnings and canopies: Modifies section to include tornado.

Section 1609.5 Tornado Loads: Added new section for charging language for tornado loads as well as a new **Figure 1609.5 Tornado Prone Region** to determine where tornado loads must be considered, per ASCE 7-22 Chapter 32.

Section 1609.5 Roof systems: This is to update the section number to 1609.6 after adding the new section 1609.5 for Tornado loads.

Section 1609.5.1 Roof deck: This updates to the new section number of 1609.6.1 and clarifies the requirement to be the greater of wind or tornado pressures for roof deck design.

Section 1609.5.2 Roof coverings: This updates the new section number 1609.6.2 as well as updates the pointers to the new section numbers.

Section 1609.5.3 Rigid Tile: This updates to the new section number of 1609.6.3 as well as adds new section**1609.6.3.1 Wind loads** and **1609.6.3.2 Tornado loads** to differentiate the requirements for wind and tornado. Also the new section 1609.6.3.2 for tornado loads clarifies the terms to be used in Equation 16-18 as well as adds pointers to ASCE 7 Chapter 32. [NOTE TO EVERYONE: cdpAccess would not permit me to strikeout the redundant "Section 1609.5.3 Rigid Tile" following the new section "Section 1609.6.3.1 Wind Loads" shown in the PDF of this proposal. My intention is to strike out "~~Section 1609.5.3 Rigid Tile~~" but cannot in cdpAccess at the time of this submittal.]

Section 2308.2.3 Allowable loads: This adds a requirement that allowable loads for conventional light-frame construction shall not be used on any portion of the design where tornado loads govern. This is written to specifically address only the portions of the design - specific to each element - where the loads are governed by tornado loads and does not intend to exclude the rest of the project that is not governed by tornado loads.

TECHNCIAL REASON STATEMENT:

Overview

Tornado hazards have not previously been considered in the design of conventional buildings, despite the fact that tornadoes and tornadic storms cause more fatalities than hurricanes and earthquakes combined (NIST 2014) and more catastrophe insured losses than hurricanes and tropical storms combined (Insurance Information Institute 2021). This gap is addressed for the first time in ASCE 7-22, which now includes requirements for tornado loads. The tornado hazard maps and load methodology are based on a decade of research and development led by the National Institute of Standards and Technology (NIST), in collaboration with ASCE, following the record 2011 tornado season (1,691 tornadoes causing 553 fatalities). ASCE 7-22 requirements for tornado loads apply to Risk Category III and IV buildings and other structures sited in the tornado-prone region, which is approximately equal to the area of the U.S. east of the Continental Divide.

The tornado loads specified in the new Chapter 32 provide reasonable consistency with the reliability delivered by the existing criteria in ASCE 7 Chapters 26 and 27 for the Main Wind Force Resisting System (MWFRS), using the same return periods as the basic wind speed maps in Chapter 26 for Risk Category III and IV facilities (1,700 and 3,000 years, respectively). At return periods of 300 and 700 years (used for wind speeds with Risk Category I and II structures), tornado speeds are generally so low that tornado loads will not control over Chapter 26 wind loads. Therefore, design for tornadoes is not required for Risk Category I and II buildings and other structures.

ASCE 7-22 tornado design speeds for Risk Category III and IV structures range from 60 to 138 mph, depending on geographic location, Risk Category, and effective plan area (which is a function of the building footprint size and shape). This approximately corresponds to the speeds for Enhanced Fujita Scale EF0- EF2 tornadoes, which are not the most intense tornadoes but they are the most common. During the period from 1995 to 2016, over 89% of all reported tornadoes were EF0-EF1, and 97% were in the range of EF0-EF2. Furthermore, most of the area impacted by a tornado does not experience the maximum winds speeds on which the tornado is rated. For example, in the 2011 EF-5 tornado that damaged or destroyed approximately 8,000 buildings in Joplin, Missouri, an estimated 72% of the area swept by the tornado experienced EF0-EF2 winds, while just 28% experienced EF3 and greater winds (NIST 2014). It should also be noted that while property losses per individual tornado increase dramatically with increasing EF number, the aggregate losses caused by all EF1 tornadoes are very similar in magnitude to aggregate losses for all EF2s, for all EF3s, for all EF4s, and for all EF5s (NIST 2014). This is due to the fac that there are so many more lower-intensity tornadoes; e.g., only 59 of the nearly 66,000 recorded tornadoes since 1950 have been rated as EF-5.

To make it very clear that the ASCE 7 tornado provisions are not intended to provide protection from the most violent tornadoes, a large User Note on the first page of the Tornado Load chapter advises readers as follows:

Options for protection of life and property from more intense tornadoes include construction of a storm shelter and/or design for longer-return-period tornado speeds as provided in Appendix G, including performance-based design. A building or other structure designed for tornado loads determined exclusively in accordance with Chapter 32 cannot be designated as a storm shelter without meeting additional critical requirements provided in the applicable building code and ICC 500, the ICC/NSSA Standard for the Design and Construction of Storm Shelters. See Commentary Section C32.1.1 for an in-depth discussion on storm shelters. (ASCE 7-22 Section 32.1.1)

The referenced commentary section explains that life safety protection against the most violent tornadoes requires a tornado shelter that meets the *ICC 500 Standard for Design and Construction of Storm Shelters*(ICC 2020), or a tornado safe room meeting FEMA P-361 guidelines (FEMA 2021; note that Safe Rooms must meet all ICC 500 requirements plus additional FEMA Funding Criteria). Tornado hazard criteria for ICC 500 and FEMA P-361 are much more stringent than ASCE 7, reflecting the purpose to provide ‘near-absolute life safety protection' as described by FEMA (2021). For example, the tornado shelter design speed in the central US is 250 mph. This compares to ASCE 7 speeds of 78-124 mph for Risk Category III and 95-138 mph for Risk Category IV, where the lower and upper values in the ranges correspond to 1 ft^2 and 4 million ft^2 effective plan areas, respectively.

Tornado Hazards

Among the many reasons that building codes and standards have not previously required design for tornado hazards is the misperception that tornadoes are too rare. As seen in Figure 1, in recent decades there have been an average of 1,251 *reported* tornadoes per year. The apparent smaller numbers of tornadoes from the 1950s through the early 1990s is primarily due to reporting issues, before there were doppler radar networks, cell phones, and trained spotter networks. Even today, many tornadoes in areas of low population density go unreported, in a well-known effect called *population bias*. There are less tornadoes per square mile per year recorded in very rural areas compared to suburban and urban areas in the same region of the country. The average annual frequency of tornadoes per state is shown in Figure 2, with the majority of tornadoes occurring in the Central and Southeast states.

Although the peak months for tornado activity in the US are in the spring, tornadoes can and do occur year-round. The end of 2021 yielded a record-setting December. The "Quad-State Tornado Outbreak" on December 10-11 spawned 68 tornadoes across 10 states, including two that tracked for more than 100 miles. This outbreak caused 90 confirmed fatalities. "The total damages and economic losses resulting from the historic tornado outbreak that impacted multiple states from the South to the Midwest could amount to $18 billion, which would make it the costliest tornado outbreak in U.S. history," (AccuWeather 2021). The day after AccuWeather published that loss estimate, a derecho over the upper Midwest on December 15-16 caused another outbreak of 94 tornadoes. December yielded a total of 193 tornadoes across the Midwest and Southeast, including 42 EF-0, 96 EF-1, 42 EF-2, 6 EF-3, and 2 EF-4 tornadoes, with 5 more rated as unknown intensity (Figure 3).

While tornadoes have been recorded in all 50 states, the overwhelming majority occur east of the Continental Divide as seen in Figure 4. Even from this raw data, it is apparent why the tornado prone-region is east of the Rocky Mountains. The most intense tornadoes, shown in the darker colors, generally occur in the Central US, except near the Gulf Coast. Similarly, there are fewer intense tornadoes along the Atlantic Coast states. The coastal states have a large number of lower intensity tornadoes, many of them generated by hurricanes. In comparison, the Mountain and Western States experience relatively few tornadoes, and almost no strong (EF2-EF3) or violent (EF4-EF5) tornadoes.

Tornadoes can vary significantly in size. Path lengths range from as short as tens of yards to over a hundred miles. December's Quad-State Tornado tracked 166 miles across Arkansas, Missouri, Tennessee and Kentucky over the span of 4 hours. It was the 9th longest tornado on record (the longest being 219 miles). Path widths vary from around 10 yards to over a mile. The widest tornado on record occurred in El Reno, Oklahoma in 2013, with a maximum path width of 2.6 miles. The average path length for the December 2021 tornadoes was 8.8 miles, while the average maximum path width was 184 yards (Figure 3).

It is clear from the climatology that tornadoes are not rare events. For example, Oklahoma City has been struck by at least 141 tornadoes since 1940, for an average of nearly 2 per year (NWS 2022a). Another way to understand how frequent tornadoes actually are is to consider them from a building impacts perspective. Mining of event and episode narratives from NOAA's National Centers for Environmental Information (NCEI) Storm Events Database from 1993-2020 indicated at least 647 reports of schools being struck by tornadoes. Figure 5 shows the number of preK-12 schools per state that were struck by tornadoes. This average of more than 23 schools per year is a lower bound. The purpose of the Storm Events Database narratives is not to document school impacts per se, but rather summarize key features of storm and its overall impacts. Schools are often mentioned, but this is by no means a complete data source for school strikes. Review of other databases, post-storm reports, news searches, and other sources of information revealed many additional schools that were struck by tornadoes during this time period.

One recent example school impact: in a terrible way to ring in the new year, Veterans Memorial Middle School in Covington, Georgia was struck by an EF-1 tornado on December 31, 2021 (Figure 6). According to the National Weather Service, which conducted its assessment on New Year's Day, structural damage was observed at the school (NWS 2022b). "The tornado reached peak intensity of 90 mph as it hit Veterans Middle School removing significant amounts of siding and roofing from the gymnasium and sections of roof."

Tornado Load Provisions

The commentary chapter C32 of ASCE 7-22 provides descriptions and references supporting the development and application of the tornado load provisions. A brief summary is provided below.

Introduction. The tornado hazard maps and load methodology were developed over the course of a decade of R&D by the National

Institute of Standards and Technology, working closely with Applied Research Associates, Inc. and ASCE. The ASCE 7 tornado load provisions were developed by the ASCE 7 Tornado Task Committee in cooperation with the ASCE 7 Wind Load and Load Combinations Subcommittees. Three workshops were held (two at ASCE headquarters, in September 2015 and May 2019) in support of the tornado hazard map development. A broad range of stakeholders were informed about the detailed plans for map development at the first two workshops and advised on the details of the final methodology and draft maps at the last workshop. Stakeholder feedback from all workshops was incorporated into the final tornado hazard maps and load methodology.

Incorporation of Tornado Loads in ASCE 7. Tornado load are treated completely separately from wind loads, hence their inclusion in a new chapter. While tornadoes are a type of windstorm, there are significantly different characteristics between tornadoes and other windstorms. For instance, tornadic winds have significant updrafts near the core; rapid atmospheric pressure changes can induce loads; and load combinations including tornado loads are not always the same as those including other wind loads (e.g., tornadoes are warm weather phenomena, so snow loads would not be included in combination with tornado loads). As a result of these considerations, tornado loads are treated separately from wind loads, not as a subset of wind loads. This is analogous to the separate treatment of flood loads and tsunami loads; both are hydrodynamic loads on buildings, but the nature of the hazard and the hazard-structure interaction is different enough that they are considered as completely separate loads.

Tornado Load Procedures. The tornado load procedures are based on the overall framework of the ASCE 7 wind load procedures. Tornado velocity pressure and design pressure/design load equations are similar to those found in Chapters 26-31 (exclusive of Chapter 28 Envelope Procedure, where the underlying methodology is incompatible with the tornado load approach). However, most of the terms used in the tornado load equations have some differences compared to their wind load counterparts, reflecting the unique characteristics of tornadic winds and wind-structure interaction in contrast to straight-line winds. Several wind load parameters are not used in the tornado load chapter, while Chapter 32 also introduces a few new and significantly revised parameters.

Tornado Hazard Maps. Critical to development of the entire tornado load methodology was creation of a new generation of tornado hazard maps. The R&D needed to create these maps broke new ground in a number of areas. For example, novel approaches to quantify the well-known problems of population bias (where more tornadoes are reported in areas having greater population) and to capture regional variation in tornado climate were developed and applied. Tornado wind speeds associated with the Enhanced Fujita (EF) Scale intensity ratings were derived through engineering analysis instead of relying on the original EF Scale methodology, which was based on expert elicitation. The tornado hazard maps take spatial effects into account (since larger buildings are more likely to be struck by a tornado, tornado wind speeds increase with increasing plan (i.e., footprint) area of the building). These efforts resulted in a set of state-of-the-art probabilistic tornado hazard maps prescribing tornado design wind speeds for a wide range of return periods and target building plan area sizes, enabling tornado-resistant design of conventional buildings and infrastructure, including essential facilities.

The mapped tornado speeds represent the maximum 3-s gust produced by the translating tornado at a height of 33 ft anywhere within the plan area of the target building. The design tornado speeds for Risk Category III and IV buildings (for 1,700- and 3,000-year return periods, respectively) typically range from EF0-EF2 intensity, depending on geographic location, Risk Category, and plan size and shape. For protection from more violent tornadoes, performance-based design is explicitly allowed, and commentary on additional design requirements for storm shelters is provided. An appendix is included with tornado speeds for longer return periods. At return periods of 300 and 700 years, tornado speeds are generally so low that tornado loads will not control over Ch. 26 wind loads, hence design for tornadoes is not required for Risk Category I and II buildings and other structures.

Tornado Velocity Pressure. While the effects of terrain and topography on tornado wind speed profiles are not yet well understood, a review of near-surface tornadic wind measurements from mobile research radar platforms plus numerical and experimental simulations consistently showed wind speed profiles with greater horizontal wind speeds closer to the ground than aloft. The tornado velocity pressure profile (K_{zTor}) used has a uniform value of 1.0 from the ground up to a height of 200 ft, with a slightly smaller value at greater heights. In comparison, wind loads are based on an assumed boundary layer profile, where wind speeds are slower near the ground due to the effects of surface roughness.

Tornado Design Pressures. Atmospheric pressure change (APC) was found to have significant contributions to the tornado loads, particularly for large buildings with low permeability. The internal pressure coefficient was modified to also include the effects of APC. Since APC-related loads are not directionally dependent, the directionality factor was removed from the velocity pressure equation and added to the external pressure term (only) in the design pressure/load equations. The directionality factor K_d was modified through analysis of tornado load simulations on building MWFRS and components and cladding (C&C) systems. The resulting tornado directionality factor K_{dT} has values slightly less than the corresponding windK_d values, with the exception of roof zone 1' (in the field of the roof), which increased. External pressure and force coefficients for both the MWFRS and C&C remain unchanged, but a modifier (K_{vT}) was added to account for experimentally determinized increases to uplift loads on roofs caused by updrafts in the core of the tornado.

Reliability. A reliability analysis was conducted to evaluate the tornado load provisions for the purpose of identifying appropriate return periods for the tornado hazard maps. This effort was conducted by a working group composed of members from both the ASCE 7-22 Load Combinations and Wind Load Subcommittees. Monte Carlo analyses (adapted from the ASCE 7-16 wind speed map return period analysis) were used, in which significant uncertainties for system demands and capacity were identified and quantified in the form of random variables with defined probability distributions. The results of this series of risk-informed analyses showed that the tornadic load criteria of Chapter 32 provided reasonable consistency with the reliability delivered by the existing criteria in Chapters 26 and 27 for MWFRS; therefore confirming that the 1,700- and 3,000-year return periods used for Risk Category III and IV wind hazard maps (respectively) in Chapter 26 were also suitable return periods to use for the tornado hazard maps.

Load Combinations. In both the Strength and Allowable Stress Design (ASD) load combinations that maximize wind load effects, the wind load term W is replaced by the term (W *or* W_T), where W_T is the tornado load. Tornado loads do not appear in combinations that maximize other loads where wind is an arbitrary point-in-time load.

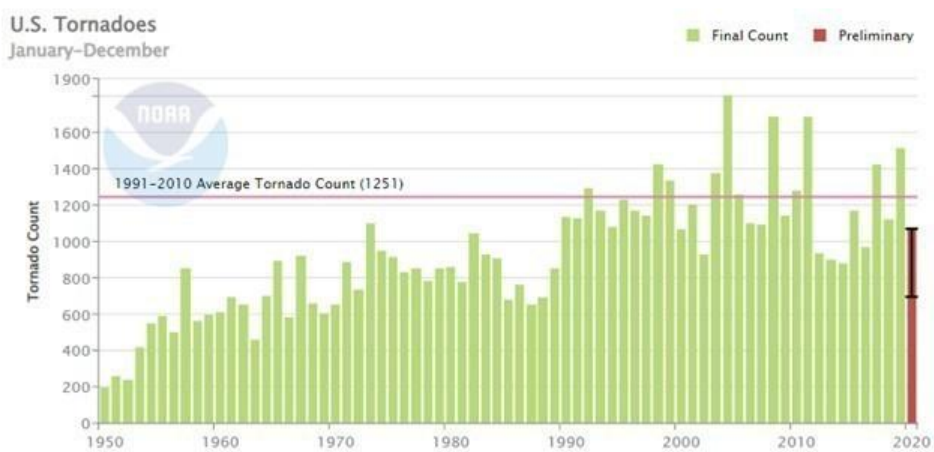


Figure 1. Number of *reported* tornadoes per year from 1950-2020 (NCEI 2022).

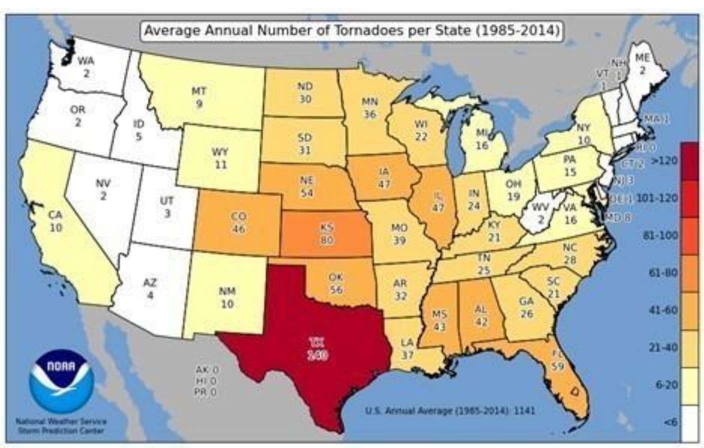


Figure 2. Average annual number of tornadoes per state (SPC 2022).

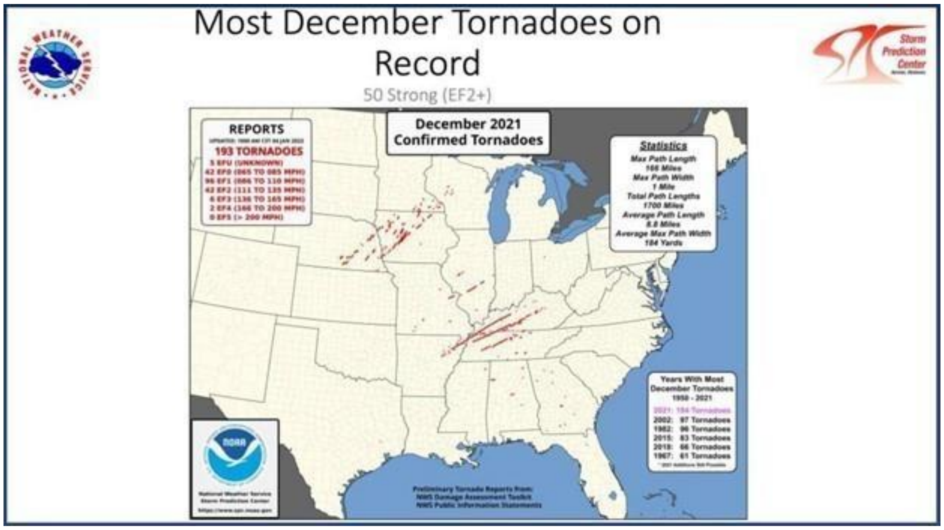


Figure 3. December 2021 produced a record 193 tornadoes across 17 states. (source: NOAA/NWS/Storm Prediction Center)

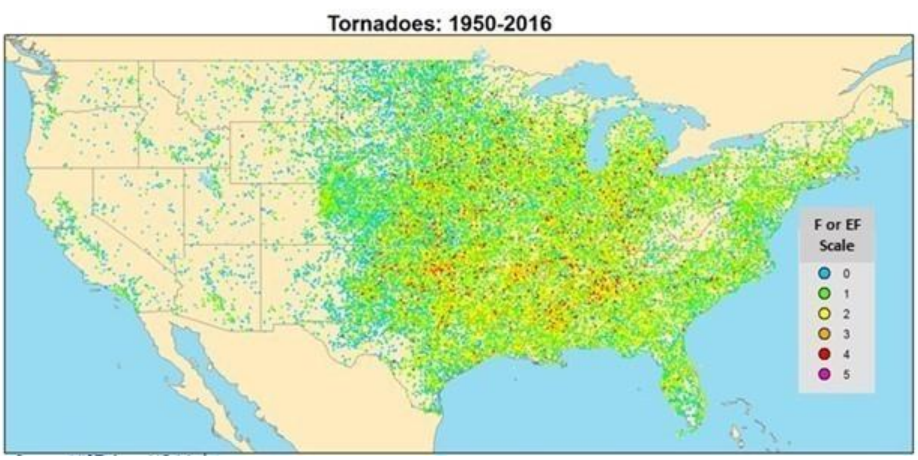


Figure 4. Map of tornado locations from 1950-2016 (source: NIST, using NOAA data).

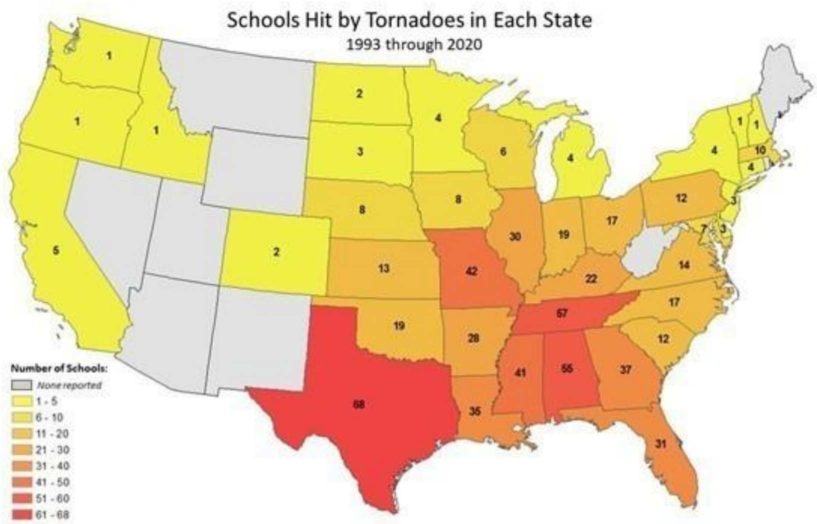


Figure 5. Lower bound for the number of schools struck by tornadoes, per state, for the 28-year period of 1993-2020 (source: NIST, using NOAA data).

Figure 6. EF-1 tornado in Covington, Georgia on New Year's Eve, 2021 (left); resulting damage to Veterans Memorial Middle School (right). (source: NWS)

References:

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National Institute of Standards and Technology (NIST). 2014. Final report: NIST technical investigation of the May 22, 2011, tornado in Joplin Missouri. NCSTAR 3, March. https://doi.org/10.6028/NIST.NCSTAR.3

National Weather Service (NWS). 2022a. Tornadoes in the Oklahoma City, Oklahoma Area Since 1890. https://www.weather.gov/oun/tornadodata-okc

NWS. 2022b. NWSChat - PUBLIC INFORMATION STATEMENT, NATIONAL WEATHER SERVICE PEACHTREE CITY GA, 258 PM EST SAT JAN 1. https://nwschat.weather.gov/p.php?pid=202201011958-KFFC-NOUS42-PNSFFC

Storm Prediction Center (SPC). 2022. Annual Averages: Tornadoes by State. National weather Service/ National Oceanic and Atmospheric Administration. https://www.spc.noaa.gov/wcm/

Cost Impact: The code change proposal will increase the cost of construction
This proposal may increase the cost of construction for Risk Category III and IV buildings and other structures located in the tornado-prone region where tornado loads govern the design.

The ASCE 7-22 tornado load provisions in Section 32.5.2 include provisions to help identify many of the situations where tornado loads will not control any aspects of the wind load design. If the tornado speed $V_T < 60$ mph, tornado loads will not control over wind loads, so design for tornado loads is not required. Additionally, if the tornado speed is less than a certain percentage of the basic (non-tornado) wind speed, V, tornado loads will not control. For structures located in wind Exposure Category B or C, design for tornado loads is not required where $V_T < 0.5V$ or $V_T < 0.6V$, respectively (in this context, Exposure B means that the structure is surrounded on all sides by urban, suburban or wooded terrain, otherwise it would be considered Exposure C). The exposure category does not change the tornado loads, while wind loads in Exposure B are less than in Exposure C. Therefore, a building located in Exposure B is more likely to have tornado loads control over wind loads compared to the same building in Exposure C.

Whether or not tornado loads will ultimately control any aspects of the wind load design for a particular structure is dependent on a large number of factors, including but not limited to:

1. tornado speed, which is a function of
   - geographic location
   - Risk Category
   - effective plan area, which depends on footprint size and shape
2. basic wind speed, which is a function of
   - geographic location
   - Risk Category
3. wind exposure category
4. building shape
5. roof geometry
6. roof height
7. enclosure classification
8. designation as an essential facility or not

Maps were created to show where design for tornado loads is not required, based on the tornado speed criteria in the previous paragraph. Examples for a medium size Risk Category III facility and a very large Risk Category IV facility are shown in Figures 7 and 8, for both Exposures B and C. At locations where the tornado speed is greater than the specified percentage of the basic wind speed, design for tornado loads is required but may still not control. This is because the net pressure loading patterns on a building are different for tornadic versus non-tornadic winds, due to the differences in wind and wind-structure interaction characteristics which are reflected by factors 4 through 8 above.

For a medium-sized Risk Category III building, the tornado speeds are less than 60 mph across much of the tornado prone region (Figure 7). Tornado loads are required only in the areas shaded with the warm colors, which spans roughly between north Texas, central

Minnesota, and the central Carolinas. In contrast, tornado loads are required across most of the tornado-prone region for very large Risk Category IV facilities, except New England and small areas of south Florida and south Louisiana for Exposure C (Figure 8). In both figures, the darker reds indicate areas that tornado loads are more likely to exceed wind loads. In general, tornado loads are more likely to control at least some element(s) of the wind load design for buildings and other structures that have one or more of the following characteristics:

- are located in the central or southeast US, except near the coast (where hurricanes can dominate the extreme wind climate),
- are Risk Category IV,
- have large effective plan areas,
- are designated as Essential Facilities,
- are located in Exposure B,
- have low mean roof heights, and
- are classified as enclosed buildings for purposes of determining internal pressures.

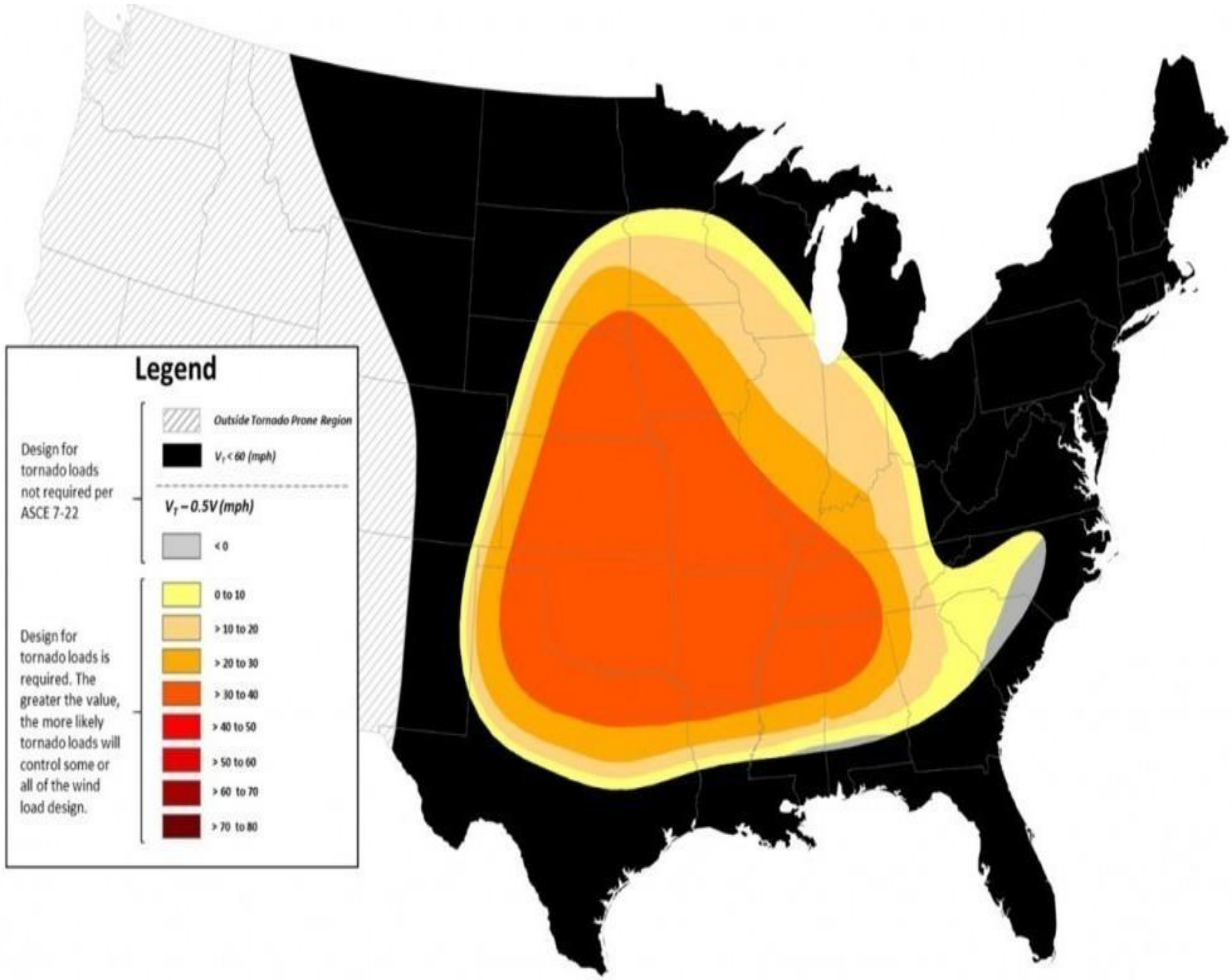
A case study was conducted to compare MWFRS and C&C pressures between ASCE 7-16 (non-tornado) and ASCE 7-22 tornado provisions in the Dallas / Fort Worth area of Texas, and also consider the cost impacts. The case study considered four building types, an elementary school, a high school, a fire station, and a large hospital facility. The schools were Risk Category III, while the fire station and hospital were Risk Category IV essential facilities. All were new construction (no additions or renovations).

The elementary school was assumed to have an effective plan area of 100,000 f^2t while the high school was 500,000 ft^2. For the two-story schools, the basic wind speed V = 112 mph, while the tornado speeds for the elementary and high school were V_T = 90 and 102 mph, respectively. Even though the tornado speeds were less than the basic wind speeds, tornado loads exceeded wind loads for many elements of the design. The high school experienced greater increases in design pressures compared to the elementary school, given its greater tornado speed. The tornado loads were generally larger than the corresponding wind loads, with the most significant impacts occurring where the magnitude of MWFRS and C&C pressure coefficients are relatively small. Tornado suction pressures on the leeward wall and uplift pressures in the field of the roof were more than double the corresponding wind loads in some instances. This was primarily due to the increased tornado internal pressure coefficient and the new pressure coefficient adjustment factor for vertical winds, which increases the uplift on the roof. These surfaces have the smallest magnitude pressures to begin with, so increases of internal pressure and other coefficients have more relative effect. MWFRS loads on the windward walls of all schools also increased (again, due to internal pressures), but less than on the leeward walls. The net lateral loads on the buildings were not significantly impacted (internal pressure cancels out). MWFRS and C&C tornado pressures on roof edges and corners generally increased for the Exposure B cases, but were similar to or smaller than the corresponding wind design pressures when the schools were in Exposure C.

Although specific percentage changes to design pressures are dependent on many factors as discussed previously, the trend for the greatest relative impacts to occur on parts of the building or structure that have the smallest absolute values of wind loads holds true, as was the case for the fire station and hospital examples. The fire station and hospital were designed with effective plan areas of 15,000 ft^2 and 4 million ft^2 and heights of 20 ft and 80 ft (5-stories), respectively. The basic wind speed for Risk Category IV facilities in the DFW area is V = 115 mph. Tornado speeds for the fire station and hospital were V_T = 97 and 123 mph, respectively. The relative impacts on the fire station were generally somewhere between those for the elementary and high schools. The hospital, with its much greater tornado speed due to the large effective plan area, experienced greater relative pressure differences. For example, C&C tornado pressures (for effective wind area of 200 ft^2) exceeded corresponding wind pressures across the four different flat roof pressure zones by 81 to 126% for Exposure B, and 39 to 73% for Exposure C. The tornado design pressures for the hospital were similar in magnitude to wind pressures for a comparable facility located in the hurricane-prone region along the Texas coast.

A study of the cost impacts for the schools showed that the structural cost increases were very modest. On the elementary school with a building cost of $20M, the estimated cost increases were 0.24% and 0.14% for wind Exposure B and C, respectively. For the $200M high school, the cost increases were 0.13% and 0.08% for Exposures B and C. The study did not include cladding and appurtenance costs. It should be noted that Dallas-Ft. Worth location of this case study is part of the most highly impacted area of the country (as seen in Figures 7 and 8 below), having a combination of comparatively high tornado speeds and low basic wind speeds. The increases in design pressures and costs diminish rapidly outside of the parts of the central and southeast US that experience the most frequent and intense tornadoes and have the greatest tornado speeds, roughly approximated as the area between north Texas, west Iowa, and north Alabama.

Therefore, while tornado load design could increase loads and pressures for Risk Category III and IV structures in the tornado prone area, the impacts on cost of construction resulting in increases will most likely be small when compared to the overall project costs.



Legend
Design for tornado loads not required per ASCE 7-22
Outside Tornado Prone Region
$V_T < 60$ (mph)
$V_T - 0.5V$ (mph)
< 0
Design for tornado loads is required. The greater the value, the more likely tornado loads will control some or all of the wind load design.
0 to 10
> 10 to 20
> 20 to 30
> 30 to 40
> 40 to 50
> 50 to 60
> 60 to 70
> 70 to 80

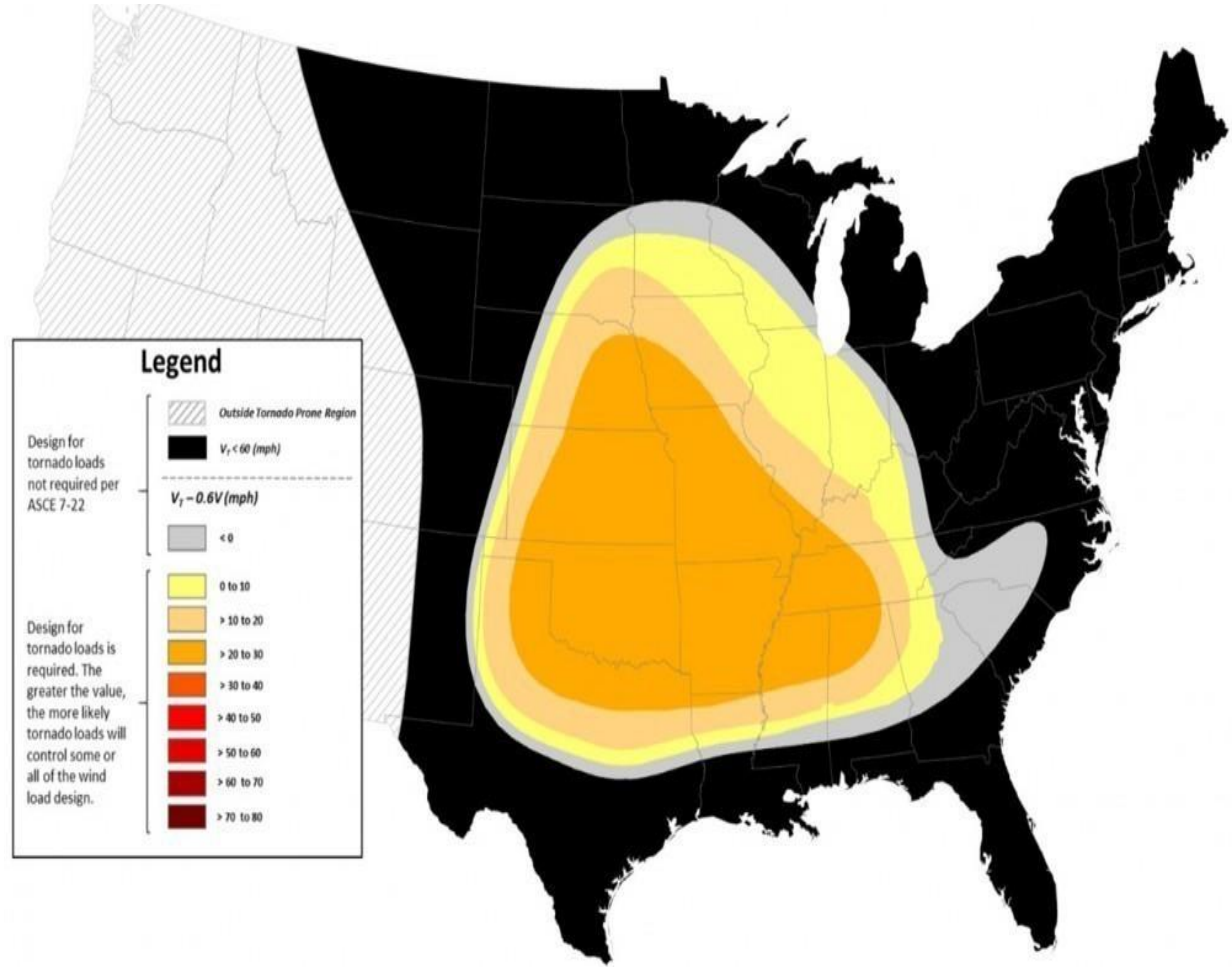
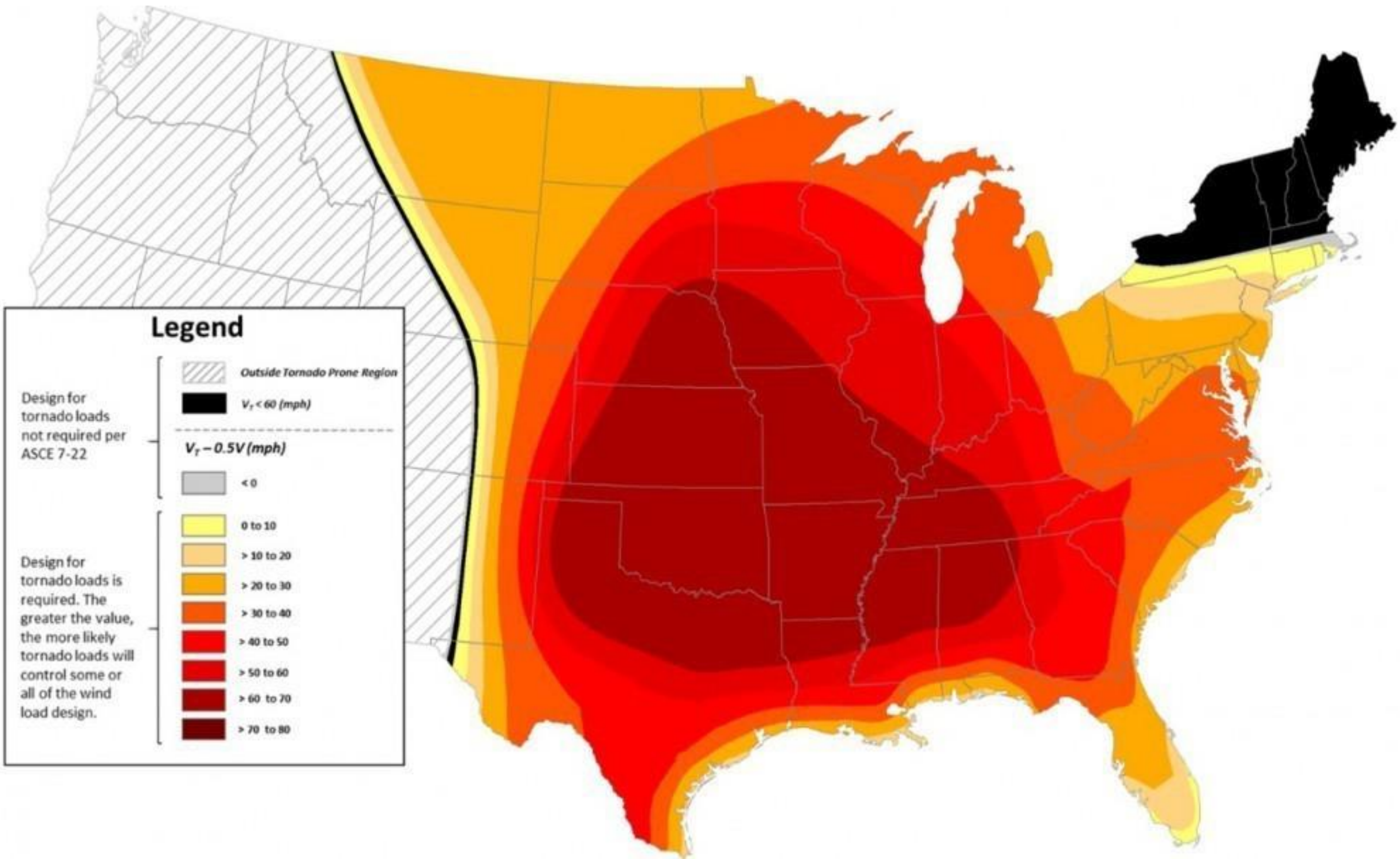


Figure 7. Locations where design for tornado loads is not required for a Risk Category III building or other structure having an effective plan area A_e = 100,000 ft^2, located in Exposure B (top) and Exposure C (bottom).



Legend
Design for tornado loads not required per ASCE 7-22
Outside Tornado Prone Region
$V_T < 60$ (mph)
$V_T - 0.5V$ (mph)
< 0
Design for tornado loads is required. The greater the value, the more likely tornado loads will control some or all of the wind load design.
0 to 10
> 10 to 20
> 20 to 30
> 30 to 40
> 40 to 50
> 50 to 60
> 60 to 70
> 70 to 80

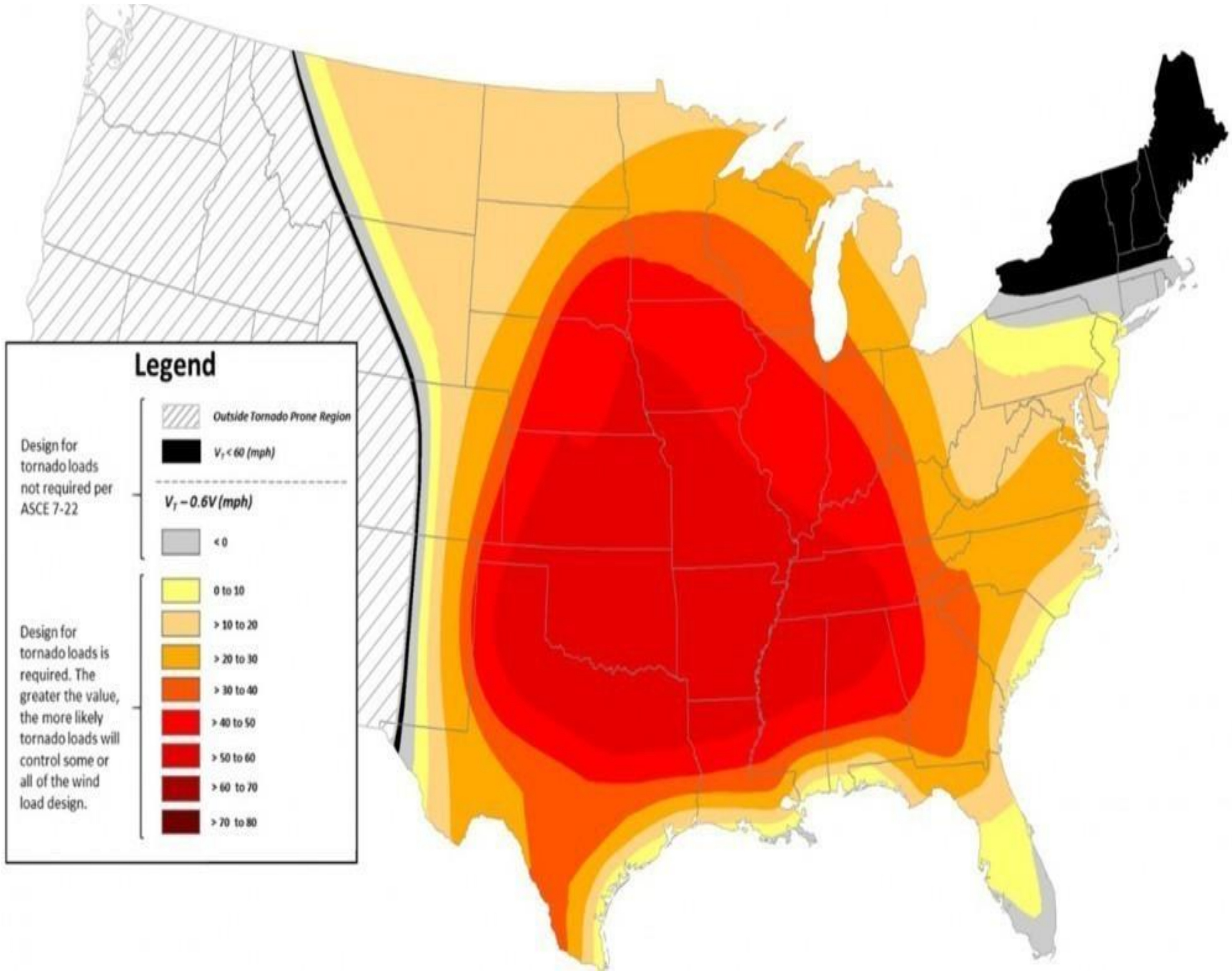


Figure 8. Locations where design for tornado loads is not required for a Risk Category IV building or other structure having an effective plan area A_e = 1,000,000 ft^2, located in Exposure B (top) and Exposure C (bottom).

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1603.1.4 Wind and tornado design data. The following information related to wind loads ~~and tornado~~ ~~*loads*~~, and where required by Section 1609.5 *tornado loads,* shall be shown, regardless of whether wind or tornado *loads* govern the design of the lateral force-resisting system of the structure:

1. Basic *wind speed*, *V* (mph), tornado speed, V_T (mph), and *allowable stress design wind speed*, V_{asd} (mph), as determined in accordance with Section 1609.3.1.
2. *Risk category*.

3. Effective plan area, A_e, for tornado design in accordance with Chapter 32 of ASCE 7.
4. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
5. Applicable internal pressure coefficients, and applicable tornado internal pressure coefficients.
6. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, pounds per square foot (kN/m^2). Where design for tornado loads is required, the design pressures shown shall be the maximum of wind or tornado pressures.

1605.1 General. Buildings and *other structures* and portions thereof shall be designed to resist the strength load combinations specified in ASCE 7, Section 2.3, the a*llowable stress design* load combinations specified in ASCE 7, Section 2.4, or the alternative a*llowable stress design* load combinations of Section 1605.2.

Exceptions:

1. The modifications to load combinations of ASCE 7 Section 2.3, ASCE 7 Section 2.4, and Section 1605.2 specified in ASCE 7 Chapters 18 and 19 shall apply.
2. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, flat roof snow*loads* of 30 pounds per square foot (1.44 kN/m^2) and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic load. Where flat roof snow *loads* exceed 30 pounds per square foot (1.44 kN/m^2), 20 percent shall be combined with seismic loads.
3. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, crane hook loads need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind loads.
4. Where design for tornado loads ~~are~~ is required, the alternative *allowable stress design* load combinations of Section 1605.2 shall not apply when tornado loads govern the design.

2308.2.3 Allowable loads. *Loads* shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average *dead loads* shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, *exterior walls*, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section 2308.6.10, stone or masonry*veneer* up to the less of 5 inches (127 mm) thick or 50 pounds per square foot (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2439) permitted for *gable* ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. *Live loads* shall not exceed 40 psf (1916 N/m^2) for floors.

   Exception: *Live loads* for concrete slab-on-ground floors in*Risk Categories* I and II shall be not more than 125 psf.

3. Ground snow *loads* shall not exceed 50 psf (2395 N/m^2).
4. Where design for tornado loads is required, tornado loads on the main wind force resisting system and all components and cladding shall not exceed the corresponding wind loads on these same elements

Committee Reason: Approved as modified as this appropriately incorporates ASCE 7-22 tornado updates into the IBC for Risk Category III and IV. The modification clarifies the scoping and the trigger. (Vote: 14-0)

Final Hearing Results	
S63-22	AM

S64-22

Original Proposal

IBC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 16, SECTION 1602, 1602.1, SECTION 1603, 1603.1.3, SECTION 1605, 1605.1, 1605.2, SECTION 1608, 1608.1, 1608.2, 1608.2.1 (New), TABLE 1608.2, FIGURE 1608.2(1), FIGURE 1608.2(2), (New), ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

Add new definition as follows:

GROUND SNOW LOAD GEODATABASE. The ASCE database (version 2022-1.0) of geocoded values of risk-targeted design ground snow load values.

GROUND SNOW LOAD, p_g. design ground snow loads

GROUND SNOW LOAD, $p_{g(asd)}$. Allowable stress design ground snow loads

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1602 NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
$p_{g(asd)}$	=	Allowable stress design ground snow load
p_g	=	Ground snow load determined from reliability-targeted (strength-based) maps in Figures 1608.2(1) through 1608.2(4)
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.

V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.
V	=	Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1603
CONSTRUCTION DOCUMENTS

Revise as follows:

1603.1.3 Roof snow load data. The ground snow *load*, p_g, shall be indicated. In areas where the ground snow *load*, p_g, exceeds 10 pounds per square foot (psf) (0.479 kN/m^2), the following additional information shall also be provided, regardless of whether snow *loads* govern the design of the roof:

1. Flat-roof snow *load*, p_f.
2. Snow exposure factor, C_e.
3. ~~Snow *load* importance factor, I_s.~~ *Risk category*.
4. Thermal factor, C_t.
5. Slope factor(s), C_s.
6. Drift surcharge load(s), p_d, where the sum of p_d and p_f exceeds 20 psf (0.96 kN/m^2).
7. Width of snow drift(s), w.

SECTION 1605
LOAD COMBINATIONS

Revise as follows:

1605.1 General. Buildings and *other structures* and portions thereof shall be designed to resist the strength load combinations specified in ASCE 7, Section 2.3, the a*llowable stress design* load combinations specified in ASCE 7, Section 2.4, or the alternative a*llowable stress design* load combinations of Section 1605.2.

Exceptions:

1. The modifications to load combinations of ASCE 7 Section 2.3, ASCE 7 Section 2.4, and Section 1605.2 specified in ASCE 7 Chapters 18 and 19 shall apply.
2. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, flat roof snow *loads* of ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2) and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic load. Where flat roof snow *loads* exceed ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2), ~~20~~ 15 percent shall be combined with seismic loads.
3. Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used, crane hook loads need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind loads.

1605.2 Alternative allowable stress design load combinations. In lieu of the load combinations in ASCE 7, Section 2.4, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. Where using these alternative allowable stress load combinations that include wind or seismic *loads*, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind *loads*, only two-thirds of the minimum *dead load* likely to be in place during a design wind event shall be used. Where using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. Where using these alternative basic *load* combinations for proportioning foundations for loadings, which include seismic *loads*, the vertical seismic *load effect*, E_v, in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero. Where required by ASCE 7, Chapters 12, 13 and 15, the load combinations including overstrength of ASCE 7, Section 2.3.6 shall be used.

$D + L + (Lr$ or $\underline{0.7}\ S$ or $R)$ **(Equation 16-1)**

$D + L + 0.6W$ **(Equation 16-2)**

$D + L + 0.6W + \underline{0.7}S/2$ **(Equation 16-3)**

$D + L + \underline{0.7}S + 0.6(W/2)$ **(Equation 16-4)**

$D + L + \underline{0.1}\ S + E/1.4$ **(Equation 16-5)**

$0.9D + E/1.4$ **(Equation 16-6)**

Exceptions:

1. Crane hook *loads* need not be combined with *roof live loads* or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow *loads* of ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2) or less and *roof live loads* of 30 pounds per square foot (1.44 kN/m^2) or less need not be combined with seismic loads. Where flat roof snow loads exceed ~~30~~ 45 pounds per square foot (~~1.44~~ 2.15 kN/m^2), ~~20~~ 15 percent shall be combined with seismic loads.

SECTION 1608 SNOW LOADS

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof *load* shall be not less than that determined by Section 1607.

Revise as follows:

1608.2 Ground snow loads. The ground snow *loads* to be used in determining the design snow *loads* for roofs shall be determined in accordance with the reliability-targeted (strength based) ground snow load values in Chapter 7 of ASCE 7 or Figures 1608.2(1) ~~and~~ through 1608.2(~~2~~4) for the contiguous United States and Table 1608.2 for Alaska. Site-specific case studies shall be determined in accordance with Chapter 7 of ASCE 7 and shall be approved by the *building official*. ~~made in areas designated "CS" in Figures 1608.2(1) and 1608.2(2). Ground snow *loads* for sites at elevations above the limits indicated in Figures 1608.2(1) and 1608.2(2) and for all sites within the CS areas shall be *approved*. Ground snow *load* determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2-percent annual probability of being exceeded (50-year mean recurrence interval).~~ Snow loads are zero for Hawaii, except in mountainous regions as *approved* by the *building official*.

Add new text as follows:

1608.2.1 Ground snow conversion . Where required, the ground snow loads, p_g, of Figures 1608.2(1) through 1608.2(4) shall be converted to allowable stress design ground snow loads, $p_{g(asd)}$, using Equation 16-17 .

$p_{g(asd)} = 0.7\ p_g$ **(Equation 16-17)**

where:

$p_{g(asd)}$ = *Allowable stress design* ground snow load

p_g = Ground snow load determined from Figures 1608.2(1) through 1608.2(4)

Revise as follows:

TABLE 1608.2 GROUND SNOW LOADS, p_g , FOR ALASKAN LOCATIONS

City/Town ~~LOCATION~~	~~Pounds per square foot~~	Elevation (ft)	Ground Snow Load, P_g[1, 2, 4] (lb/ft^2)			
	-		Risk Category			
	-		I	II	III	IV
Adak	~~30~~	100	32	40	46	50
Anchorage/Eagle River[3]	~~50~~	500	64	80	92	100
Arctic Village		2,100	38	48	55	60
~~Angoon~~	~~70~~					
~~Barrow~~	~~25~~					
~~Barter Island~~	~~35~~					
Bethel	~~40~~	100	51	64	74	80
Bettles		700	102	128	147	160
~~Big Delta~~	~~50~~					
Cantwell		2,100	109	136	156	170
Cold Bay	~~25~~	100	45	56	64	70
Cordova	~~100~~	100	128	160	184	200
Deadhorse		100	32	40	46	50
Delta Junction		400	51	64	74	80
Dillingham		100	141	176	202	220
Emmonak		100	128	160	184	200
Fairbanks	~~60~~	1,200	77	96	110	120
Fort Yukon	~~60~~	400	64	80	92	100
Galena	~~60~~	200	77	96	110	120
Girdwood		200	179	224	258	280
Glennallen		1,400	58	72	83	90
~~Gulkana~~	~~70~~					
Haines		100	237	296	340	370
Holy Cross		100	154	192	221	240
Homer[3]	~~40~~	500	58	72	83	90
Iliamna		200	102	128	147	160
Juneau	~~60~~	100	90	112	129	140
Kaktovik		100	58	72	83	90
Kenai/Soldotna	~~70~~	200	83	104	120	130
Ketchikan		100	38	48	55	60
Kobuk		200	115	144	166	180
Kodiak	~~30~~	100	45	56	64	70

City/Town LOCATION	Pounds per square foot	Elevation (ft)	Ground Snow Load, P (lb/ft)			
	-		Risk Category			
	-		I	II	III	IV
Kotzebue	60	100	77	96	110	120
McGrath	70	400	83	104	120	130
Nenana	80	400	96	120	138	150
Nikiski		200	102	128	147	160
Nome	70	100	90	112	129	140
Palmer/Wasilla	50	500	64	80	92	100
Petersburg	150	100	122	152	175	190
Point Hope		100	58	72	83	90
Saint Lawrence Island		100	122	152	175	190
Saint Paul Islands	40	100	51	64	74	80
Seward	50	100	77	96	110	120
Shemya	25					
Sitka	50	100	64	80	92	100
Talkeetna	120	400	154	192	221	240
Tok		1,700	45	56	64	70
Umiat		300	38	48	55	60
Unalakleet	50	100	45	56	64	70
Unalaska		100	96	120	138	150
Utqiagvik (Barrow)		100	32	40	46	50
Valdez	160	100	205	256	294	320
Wainwright		100	32	40	46	50
Whittier	300	100	346	432	497	540
Willow		300	102	128	147	160
Wrangell	60					
Yakutat	150	100	179	224	258	280

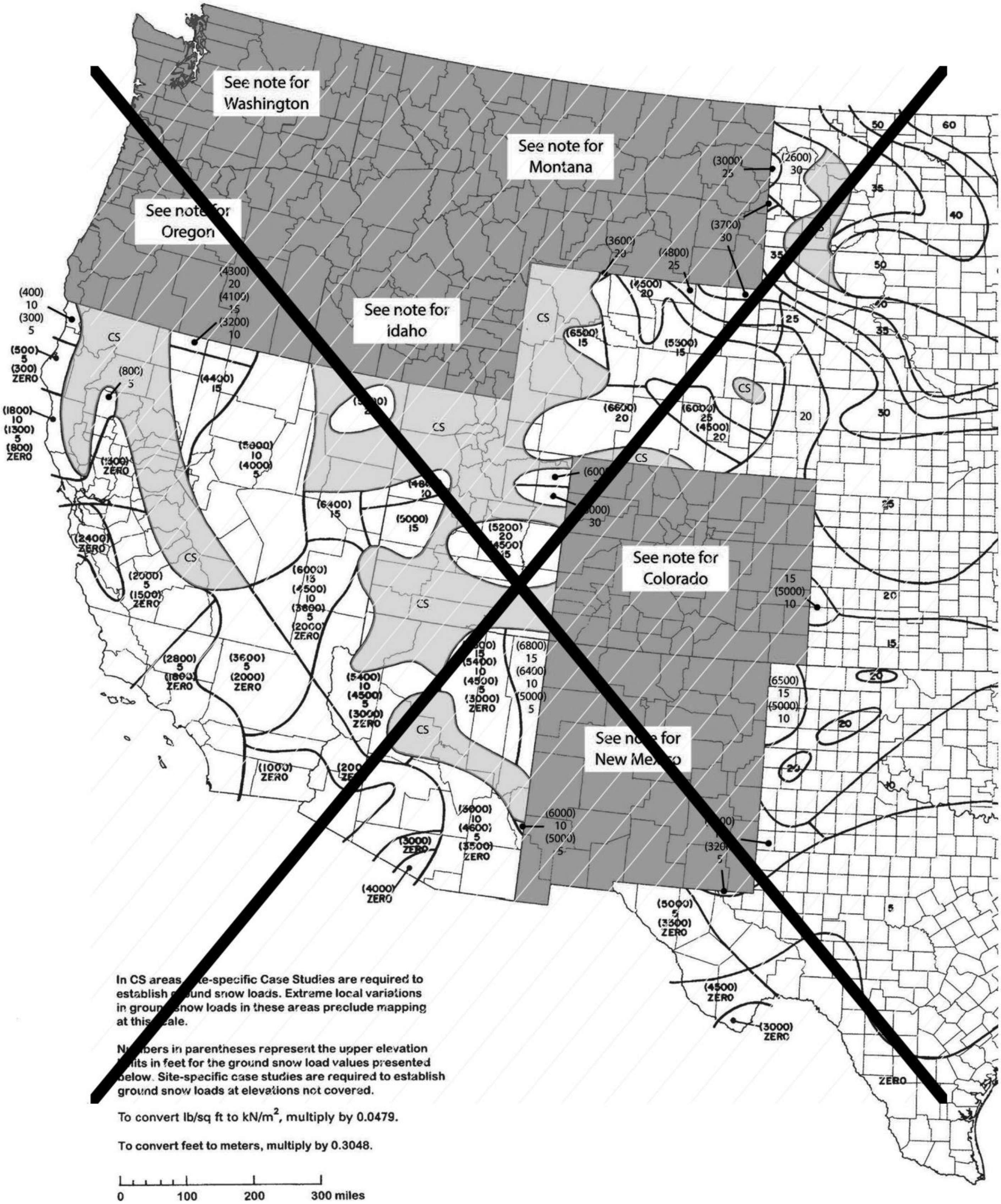
For SI: 1 pound per square foot = 0.0479 kN/m^2, 1 foot = 0.3048 m

a. Statutory requirements of the *building official* are not included in this state ground snow load table

b. For locations where there is substantial change in altitude over the city/town, the load applies at and below the cited elevation within the jurisdiction and up to 100 feet above the cited elevation unless otherwise noted.

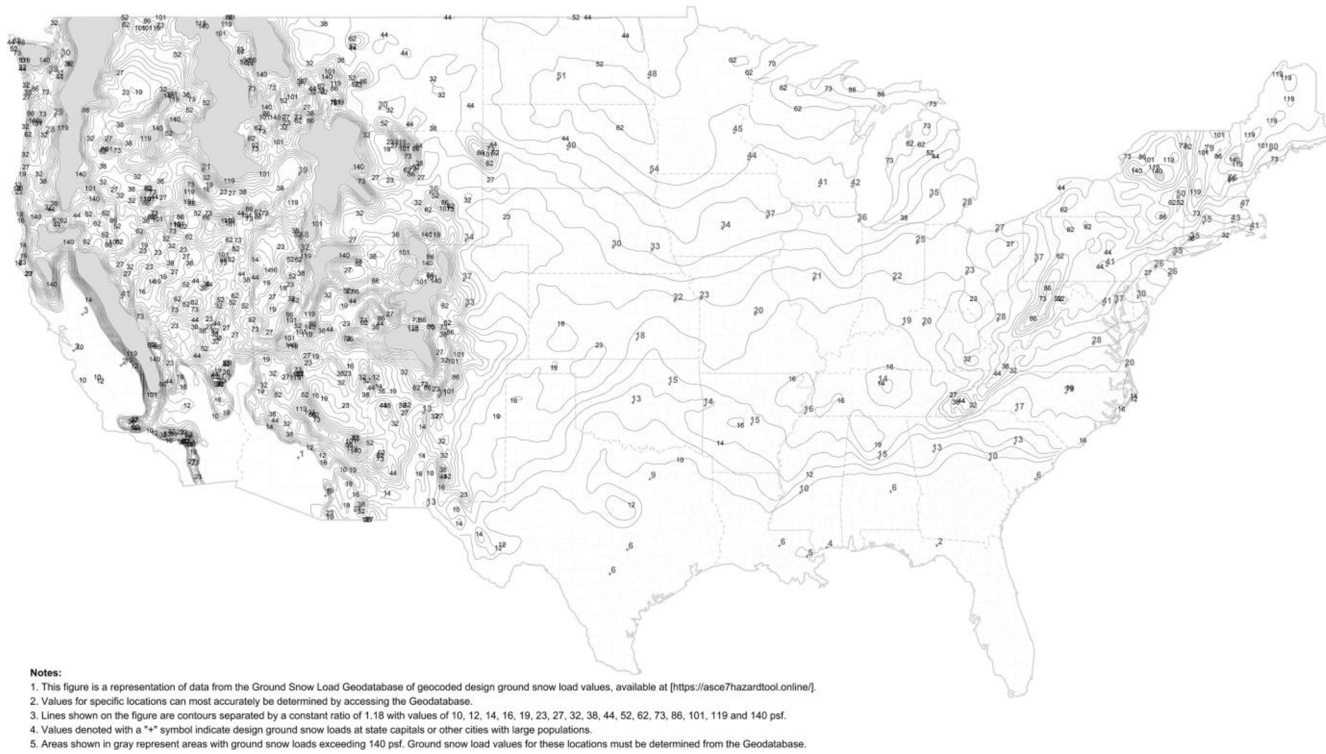
c. For locations in Anchorage/Eagle River and Homer above the cited elevation, the ground snow load shall be increased by 15% for every 100 feet above the cited elevation

Delete and substitute as follows:



~~**NOTE:** See ASCE 7 Table 7.2-2 for Colorado, Table 7.2-3 for Idaho, Table 7.2-4 for Montana, Table 7.2-5 for Washington, Table 7.2-6 for New Mexico and Table 7.2-7 for Oregon.~~

~~FIGURE 1608.2(1) GROUND SNOW LOADS, p_g , FOR THE UNITED STATES (psf)~~



NOTES:

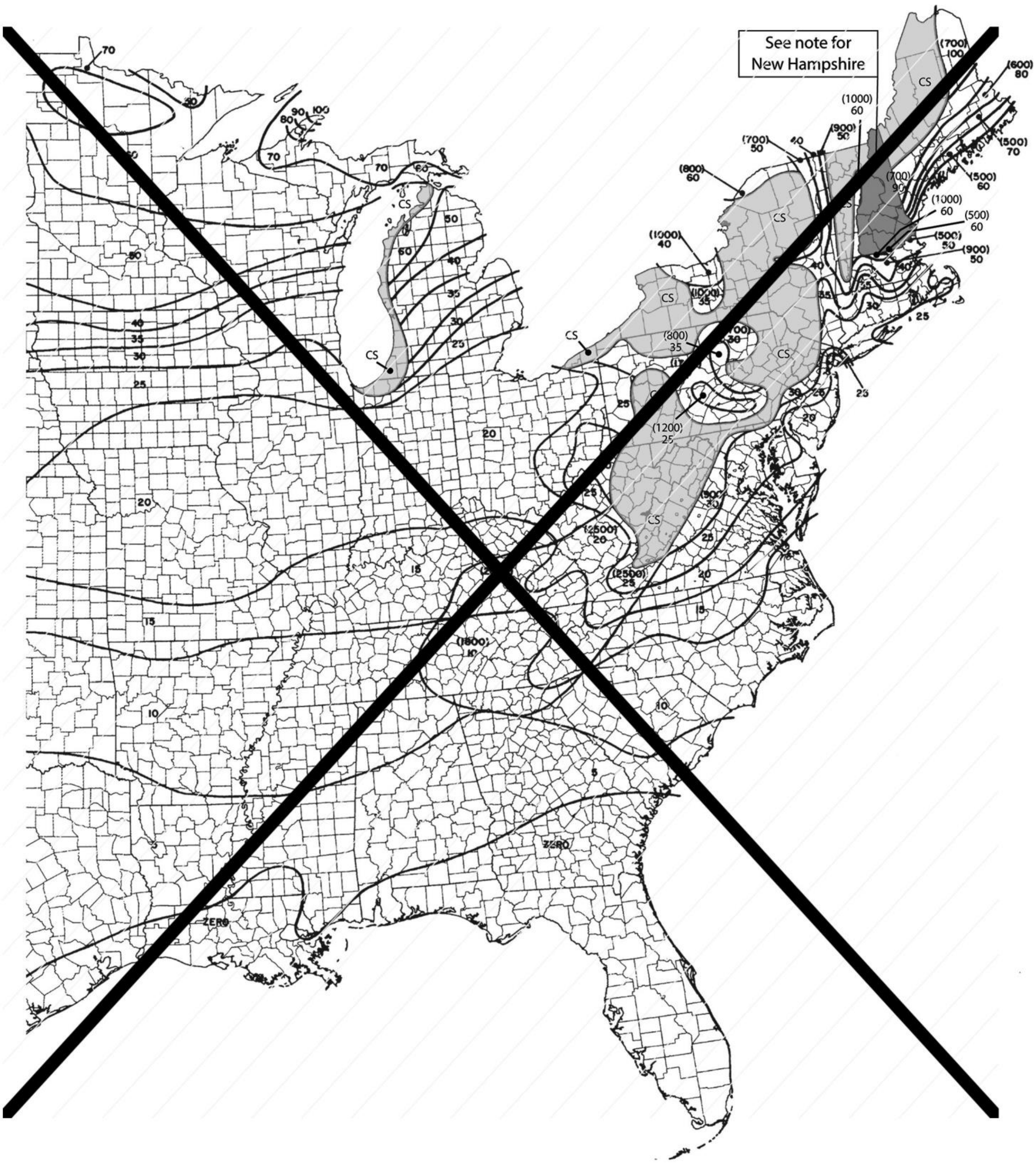
a. Location-specific ground snow load values are provided in the *Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

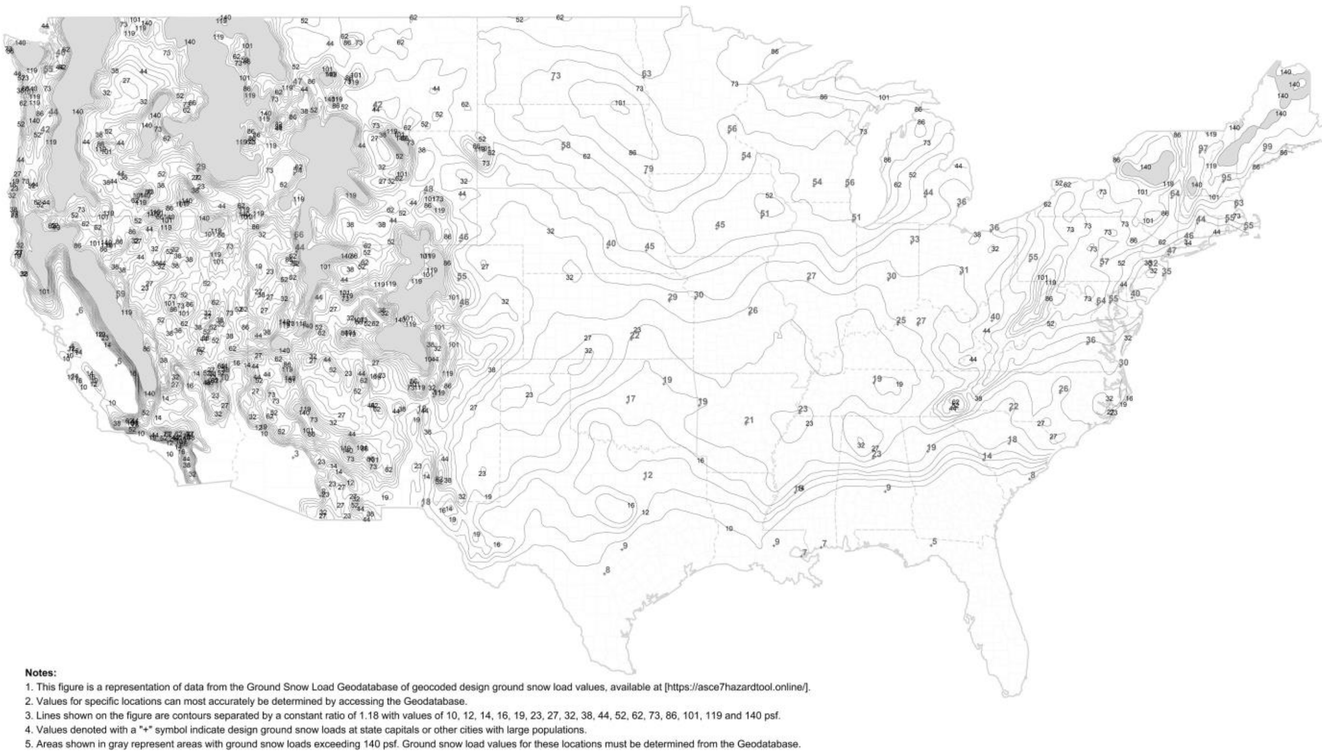
d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

Ground snow loads, p_g, for Risk Category I for the conterminous United States
FIGURE 1608.2(1) (lb/ft^2).



~~**Note:** See ASCE 7 Table 7.2-8 for New Hampshire.~~

~~**FIGURE 1608.2(2) GROUND SNOW LOADS, p_g, FOR THE UNITED STATES (psf)**~~



NOTES:

a. Location-specific ground snow load values are provided in the*Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

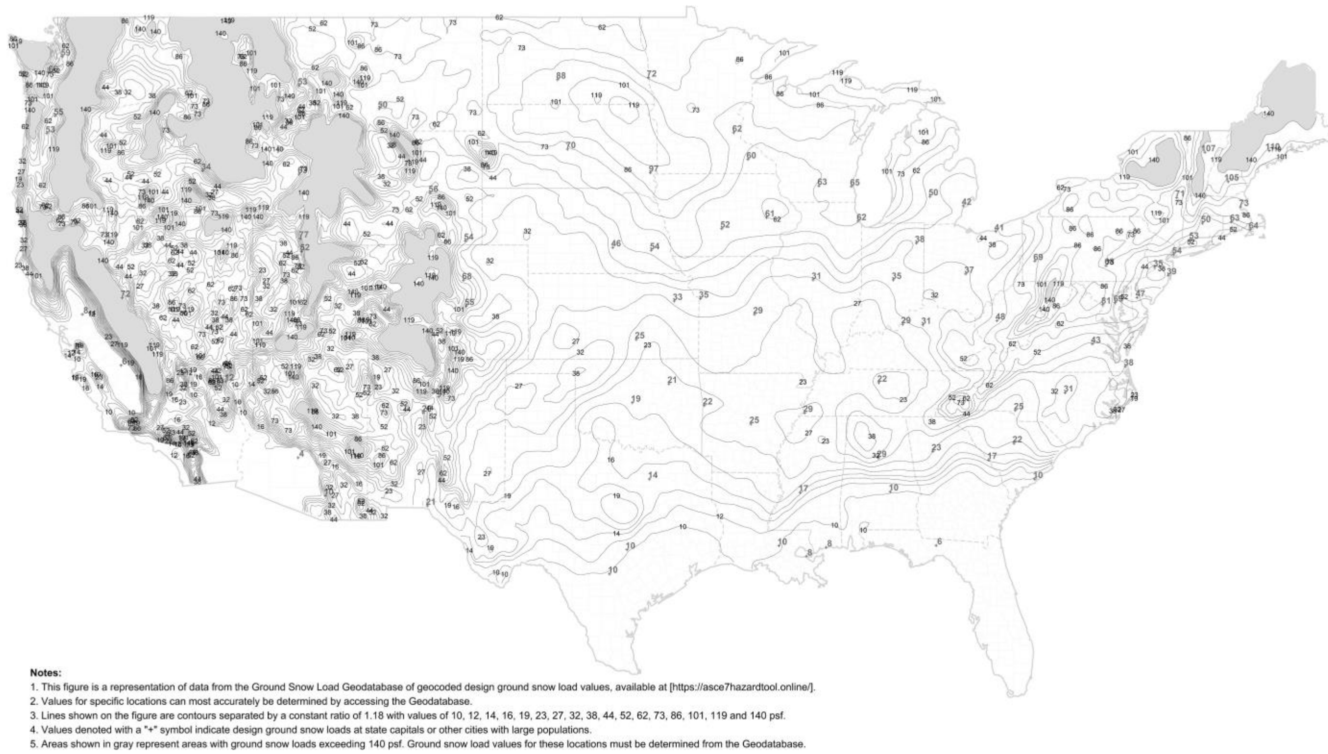
c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

Ground snow loads, p_g, for Risk Category II for the conterminous United States

FIGURE 1608.2(2) (lb/ft^2).

Add new text as follows:



NOTES:

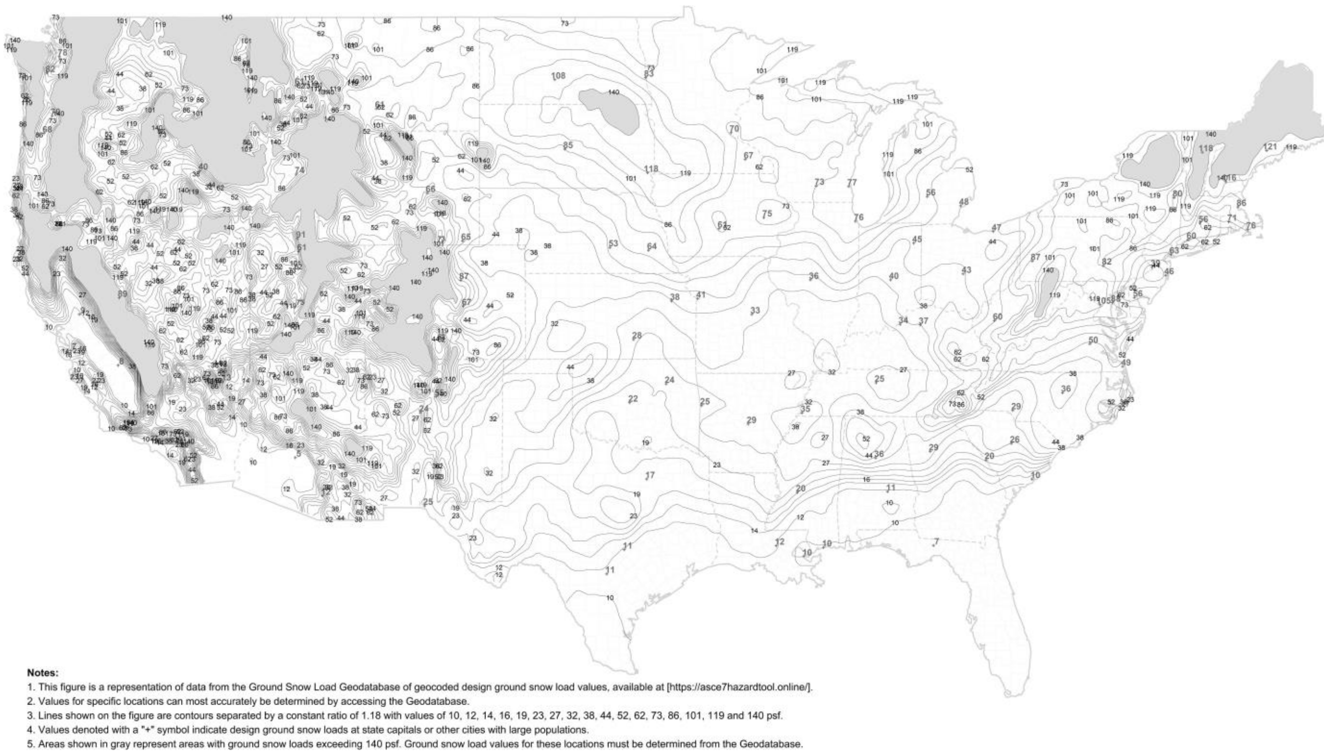
a. Location-specific ground snow load values are provided in the *Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE 1608.2(3) Ground snow loads, p_g, for Risk Category III for the conterminous United States (lb/ft^2)



NOTES:

a. Location-specific ground snow load values are provided in the*Ground Snow Load Geodatabase* of geocoded design ground snow load values, which can be accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/ or an approved equivalent.

b. Lines shown on the figure are contours separated by a constant ratio 1.18 with values of 10, 12, 14, 16, 19, 23, 27, 32, 38, 44, 52, 62, 73, 86, 101, 119, and 140 psf.

c. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.

d. Areas shown in gray represent areas with ground snow loads exceeding 140 psf. Ground snow load values for these locations can be determined from the Geodatabase.

FIGURE 1608.2(4) Ground snow loads, p_g, for Risk Category IV for the conterminous United States (lb/ft^2)

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial corrections or re-organizations. Technical updates are explained further below, along with a rationale for developing the new ground snow load data.

A summary of the specific coordination changes is provided below.

Section 202 Definitions.

Add new definition of *Ground Snow Loads Geodatabase* as the location for the geocoded values of risk-targeted design ground snow load values. The database is uniquely identified by the version (2022-1.0).

Section 1603.1 General. Added a new term $p_{g(asd)}$ to provide a value of ground snow that can be correctly used with existing provisions is the IBC and IRC. **Section 1603.1.3 Roof snow load data.** This change removes the Snow load importance factor, I_s, which is no longer needed because the ground snow loads included are now risk-targeted maps.

Section 1605.1 General. This changes the current allowable stress design limits to the appropriate strength load (30psf/0.7 = approximately 45 psf) that will be calculated from the strength-based ground snow loads from the new maps. The use of 45 psf as a bound for when snow loads are considered in seismic weight is slightly conservative based on the calculated value. Because the reliability targeted loads are greater than the unfactored 50 year MRI loads in the current standard, 15% of the snow load is used (approximately equal to 20%/1.6).

Section 1605.2 Alternative allowable stress design load combinations.

This section was updated to match the revisions in the ASD load combinations in ASCE 7-22. The factor on snow load as the principal variable load for strength design changes from 1.6 to 1.0. Changes to the ASD combinations were chosen by first dividing the current factor by 1.5 and then rounding up to the nearest 0.05. We chose not to round down because that would assume that ASD standards have a reliability as uniform as a strength design standard, which has not been demonstrated. Also the allowable stress design load limit of 30 psf is changed to a strength-based design of 45 psf as described above.

Section 1608.2 Ground snow loads. This section is updated to point to the four new risk-targeted maps in**Figures 1608.2(1) through 1608.2(4)**. It also updates the **Table 1608.2** for risk-targeted ground snow loads for Alaskan cites.

Section 1608.2.1 Ground snow conversion. This is a new section (modeled after the approach used for wind loads) that introduces a new term for allowable stress design ground snow loads, pg(asd), in order to provide a value that can be used correctly with the existing provisions in the IBC and IRC that have developed tables or charts based on the allowable stress design ground snow loads.

Technical rationale

The previous editions of ASCE 7 included mapped values for ground snow load, p_g, (GSL) based on a statistical analysis using National Weather Service snowfall data from 1952 to 1992. This map was first included in the 1992 edition of ASCE 7 and was updated with additional information for the 1995 edition. It has remained essentially as it was in 1995 for each subsequent edition through 2016. Additionally, at the time that map was generated, the authors (researchers at the Cold Regions Research and Engineering Laboratory [CRREL] of the US Army Corps of Engineers) marked as Case Study or 'CS' several significant regions, encompassing large parts of eighteen states, where the statistical analysis had not been completed or the data were insufficient to perform the analysis. The CS regions place significant burden on structural engineers to do snow load hazard analysis, and very little guidance has been provided as to how to conduct such studies.

The new GSL in ASCE 7-22 are included in four updated national GSL datasets in electronic and map form. The electronic datasets are defined in the Ground Snow Loads Geodatabase (version 2022-1.0) in ASCE 7-22, and the maps in Chapter 7 are a representation of that data. The new snow loads are also based on nearly 30 years of additional snow load data since the previous study and updated procedures for estimating snow loads from depth-only measurements. The loads account for site-specific variability throughout the United States in both the magnitude and variation of the annual ground snow loads. Additionally, this approach incorporates advanced spatial mapping that has reduced the number and size of case study regions in mountainous areas significantly and eliminates discontinuities in design values across state boundaries (Bean et al. 2021).

A very small fraction of the locations defined in the Ground Snow Loads Geodatabase indicate that a case study must be completed to determine the ground snow load. These case-study regions are now limited and apply only to locations higher than any locally available snow measurement locations. Database ground snow load values are still provided to the user, with a warning that the estimated value lies outside the range of elevations of surrounding measurement locations. Information from local experts, from the Bean et al. (2021) report, or from Buska et al. (2020) can be used to determine values at these locations.

ASCE 7-22 also includes GSL maps for each Risk Category. Each of these maps (and associated datasets) is based on reliability calculations that target the reliability objectives of Chapter 1 of ASCE 7-22. The adoption of reliability-targeted design ground snow loads represents a significant change from ASCE/SEI 7-16 and prior editions, which previously used ground snow loads with a 50-year mean recurrence interval (MRI). Reliability-targeted loads are adopted to address the nonuniform reliability of roofs designed according to the 50-year snow load in different parts of the country, due to climatic differences. In some parts of the country, designing for the 1.6 load factor times the 50-year value does not meet the reliability targets of the standard (and, in some of these places, failures due to an underestimated ground snow load have been observed); in other places, designing for the 1.6 load factor times the 50-year value is unnecessarily conservative.

Given that the values of GSL have been provided as allowable stress loads up until this point, there are many provisions within the IBC and the IRC that rely on ASD values. Therefore a new section is proposed to provide a conversion from the strength-based values provided in the reliability-targeted ground snow loads maps to an ASD value. An additional, separate code change proposal will be submitted for clarifying where existing tables are for ASD values.

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References

Bean, B., Maguire, M., Sun, Y, Wagstaff, J., Al-Rubaye, S., Wheeler, J., Jarman, S., and Rogers, M. (2021). “The 2020 National Snow Load Study.” Mathematics and Statistics Faculty Publications. Paper 276.

Buska, J., Greatorex, A., and Tobiasson, W. (2020). “Site-specific Case Studies for Determining Ground Snow Loads in the United States”. U.S. Army Corps of Engineers Engineer Research and Development Center. ERDC/CRREL SR-20-1.

Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore, as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the ground snow loads developed for ASCE 7-22 will result in some decreases in loads, but on average results in an increase in loads. The proposed code change will modestly increase the cost of construction in the areas were the snow loads have increased.

In order to estimate this impact, roof total loads that would be used in specifying roof secondary structural members, such as open-web roof joists, were calculated for approximately 80 locations throughout the portion of the conterminous US affected by snow loading. The box plot to the right shows the ratio of these Total Load results.

The average change in Total Load is a 5% increase. At most locations, the change is between a 5% reduction to a 15% increase. Regarding the effect of this average 5% increase, the increase in Total Load would generally equate to an increase in weight of these secondary members of +5% and a structural cost impact of about +2-3%. Extending this to the effects on the total in-place cost of the structure, we expect an estimated impact of +0.5-0.7%.

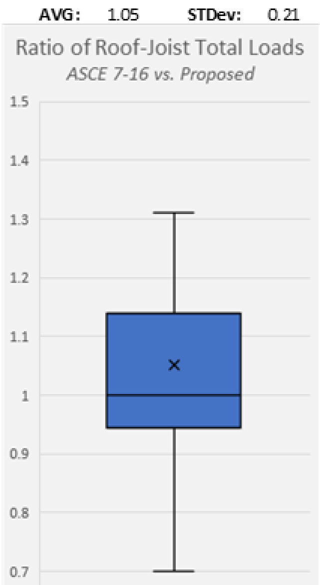

Figure 1. Box plot of ratio of roof-joist total loads of ASCE 7-16 vs. ASCE 7-22.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
$p_{g(asd)}$	=	Allowable stress design ground snow load
p_g	=	Ground snow load determined from ~~reliability-targeted (strength-based) maps in~~ Figures 1608.2(1) through 1608.2(4) and Table 1608.2
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.
V	=	Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

1603.1 General. *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

Exception: *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof dead and live loads.
2. Ground snow load, p_g <u>and allowable stress design ground snow load, $p_{g(asd)}$</u>.
3. Basic design wind speed, V, miles per hour (mph) (km/hr) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
4. *Seismic design category* and *site class*.
5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
6. Design load-bearing values of soils.
7. Rain load data.

1603.1.3 Roof snow load data. The ground snow *load*, p_g, shall be indicated. In areas where the ground snow *load*, p_g, exceeds ~~10~~ <u>15</u> pounds per square foot (psf) (~~0.479~~ <u>0.72</u> kN/m^2), the following additional information shall also be provided, regardless of whether snow *loads* govern the design of the roof:

1. Flat-roof snow *load*, p_f.
2. Snow exposure factor, C_e.
3. *Risk category*.
4. Thermal factor, C_t.
5. Slope factor(s), C_s.
6. Drift surcharge load(s), p_d, where the sum of p_d and p_f exceeds ~~20~~ <u>30</u> psf (~~0.96~~ <u>1.44</u> kN/m^2).
7. Width of snow drift(s), w.
8. <u>Winter wind parameter for snow drift, W_2.</u>

Revise as follows:

TABLE 1604.3 DEFLECTION LIMITS[a, b, c, h, i]

CONSTRUCTION	L or L_r	S[j] or W[f]	$D + L$[d, g]
Roof members:[e]			
Supporting plaster or stucco ceiling	l/360	l/360	l/240
Supporting nonplaster ceiling	l/240	l/240	l/180
Not supporting ceiling	l/180	l/180	l/120
Floor members	l/360	—	l/240
Exterior walls:			
With plaster or stucco finishes	—	l/360	—

CONSTRUCTION	*L* or *L*	*S* or *W*	*D* + *L*
With other brittle finishes	—	*l*/240	—
With flexible finishes	—	*l*/120	—
Interior partitions:[b]			
With plaster or stucco finishes	*l*/360	—	—
With other brittle finishes	*l*/240	—	—
With flexible finishes	*l*/120	—	—
Farm buildings	—	—	*l*/180
Greenhouses	—	—	*l*/120

j. The snow load shall be permitted to be taken as 0.7 times the design snow load determined in accordance with Section 1608.1 for the purpose of determining deflection limits in Table 1604.3.

Revise equation 16-5 as follows:

$D + L + \underline{0.7}\ \cancel{0.1}\ S + E/1.4$ **(Equation 16-5)**

1608.2.1 Ground snow conversion. Where required, the ground snow loads, p_g, of Figures 1608.2(1) through 1608.2(4) and Table 1608.2 shall be converted to allowable stress design ground snow loads, $p_{g(asd)}$, using Equation 16-17 .

$p_{g(asd)} = 0.7\ p_g$ **(Equation 16-17)**

where:

$p_{g(asd)}$ = *Allowable stress design* ground snow load

p_g = Ground snow load determined from Figures 1608.2(1) through 1608.2(4) and Table 1608.2.

Committee Reason: Approved as modified as this provides needed updates to ASCE 7-22 for snow loads. The modification corrects a typo, updates to strength design and adds consistency with ASCE 7.(Vote:14-0)

Final Hearing Results

S64-22 AM

S66-22

Original Proposal

IBC: 1603.1

Proponents: John-Jozef Proczka, City of Phoenix, Self (John-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1603.1 General. *Construction documents* shall show the <u>material,</u> size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

Exception: *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof dead and live loads.
2. Ground snow load, p_g.
3. Basic design wind speed, V, miles per hour (mph) (km/hr) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
4. *Seismic design category* and *site class*.
5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
6. Design load-bearing values of soils.
7. Rain load data.

Reason: The code provisions of structural designs are very reliant on the type of material being used for structural members, but there is no global requirement to identify this material, even though a code compliant design would be impossible without such identification. This change would add a global requirement to identify the material of construction for the structural members.
Construction documents are defined to include specifications, so this change would not place a requirement to identify the material of construction directly on the drawings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is essentially an editorial reorganization to place the requirements that are already inherent in the code in an obvious location

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provides a concise and clear approach to add the needed requirement for the construction documents to indicate the materials of structural members. (Vote: 10-4)

Final Hearing Results

S66-22 AS

S69-22

Original Proposal

IBC: 1604.4

Proponents: Ronald LaPlante, Division of State Architect, Federal Emergency Management Agency/Applied Technology Council -Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

1604.4 Analysis. *Load effects* on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.
Members that tend to accumulate residual deformations under repeated service*loads* shall have included in their analysis the effects of added deformations expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete *load* path capable of transferring *loads* from their point of origin to the load-resisting elements. The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the horizontal bracing system or *diaphragm*. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided that their effect on the action of the system is considered and provided for in the design. <u>Where a diaphragm is not permitted to be idealized as either flexible or rigid in accordance with ASCE 7 or for wood diaphragms in accordance with AWC SDPWS, it is permitted to perform an envelope analysis of the structure using a flexible and rigid diaphragm analysis separately and designing each component for the more severe load condition in lieu of a semirigid diaphragm analysis.</u> ~~A *diaphragm* is rigid for the purpose of distribution of *story* shear and torsional moment when the lateral deformation of the *diaphragm* is less than or equal to two times the average *story* drift.~~ Where required by ASCE 7, provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force-resisting system. Every structure shall be designed to resist the effects caused by the forces specified in this chapter, including overturning, uplift and sliding. Where sliding is used to isolate the elements, the effects of friction between sliding elements shall be included as a force.

Reason: ASCE 7 Section 12.3.1 requires that the structural analysis consider the relative stiffness of the diaphragms and the vertical elements of the seismic force-resisting system. This section also requires the structural analysis to explicitly consider the stiffness of the diaphragm with a semirigid diaphragm analysis unless the diaphragms meet certain conditions where they may be idealized as flexible or rigid. The current IBC language is in direct conflict with ASCE 7 as it permits a simple comparison of the diaphragm deflection relative to the vertical seismic force-resisting system average drift as whether a diaphragm is either rigid or flexible and this would never result in a semirigid diaphragm analysis. There are many conditions that occur in buildings where a semirigid diaphragm analysis is necessary to develop a more accurate distribution of forces in the structure. The proposed change will align the IBC with ASCE 7 while also permitting an envelope solution for buildings where a 3D analysis may not have been performed.
Furthermore, this change in necessary as the current IBC language provides no guidance on which loads are to be used to evaluate the lateral deformation of the diaphragm to compare it to the story drift to determine the rigid diaphragm condition. For example, for seismic design, diaphragms have different design loads than the vertical seismic force-resisting system when computing drift. ASCE 7 provides clarity on which design loads are to be used to compute these displacements, which the IBC is lacking.

The SDPWS provides specific requirements for when a diaphragm may be idealized as flexible or rigid and that direct reference has been added to clarify that for wood diaphragms, that standard may be used.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not, in general, increase or decrease the overall cost of construction, rather provide an alternate diaphragm

analysis approach, that in some cases may cause less design effort and in other case more design effort. The exception can be used to limit the design effort and avoid a computer analysis.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to align with ASCE 7 to appropriately permit a suitable analysis method for the case where a diaphragm is not permitted to be idealized as either flexible or rigid. (Vote: 14-0)

Final Hearing Results

S69-22	AS

S71-22

Original Proposal

IBC: 1604.5

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (AFATTAH@SANDIEGO.GOV)

2021 International Building Code

Revise as follows:

1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

~~Exception~~ Exceptions:

1. The assignment of buildings and structures to Tsunami *Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.
2. Free standing parking garages shall be assigned to *Risk Category II.*

Reason: The proposed code change is necessary to address an anomaly in the IBC whereby large parking structures that serve airports, shopping centers and other large buildings trigger a risk Category III designation when they have a floor area that exceeds 1,000,00 sq ft. The code change addresses the intent of the IBC as well as ASCE 7 whereby the codes are interested in providing more protection for buildings with a high concentration of occupants and certain large buildings that in total have 5,000 or more occupants. ASCE 7 intends to improve protection for "Buildings and other structures, the failure of which could pose a substantial risk to human life"
The occupant load for parking garages is determined based on an occupant load factor of 200 sq ft per occupant gross. There are circumstances where even when deducting drive aisles and the other items permitted to establish an occupant load based on net area the total occupant load can still exceed 5,000.The occupancy for parking garages is classified as a Group S-2 light hazard storage area and the occupant load density tends to be low due to the intermittent nature of the storage occupancy.

- It is hard to imagine that a large parking garage will have 5,000 occupants simultaneously entering or exiting a garage concurrent with the occurrence of a major earthquake.
- From experience large structures may experience partial damage or collapse but the entire structure should not collapse.

The Commentary to ASCE 7 states "Classification continues to reflect a progression of the anticipated seriousness of the consequence of failure from lowest risk to human life (Risk Category I) to the highest (Risk Category IV)." It is therefore reasonable to assign free standing parking structures to Risk Category II.

My jurisdiction recently review a 5 level 2.5 million sq ft parking plaza, a free standing open parking garage, that had to be structurally divided into two or more structures with independent means of egress and life safety systems. The garage will serve an enlarged replacement terminal at San Diego International Airport. Proponent has also heard from other jurisdictions that had similar projects.

The proposed code change shall be considered on it's own and is not reliant on the approval of other related code changes.

Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will have the effect of reducing earthquake loads on parking garages the are large and have a low concentration of occupant load.

The code change will also reduce the need to create separate structures and will allow more efficient designs where the distribution and sizing of exists is only dependent on the requirements in IBC Chapter 10. Additionally, the code change will permit the use of common life safety systems such as emergency power from a common generator or UPS system.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1604.5 Risk category. Each building and structure shall be assigned a*risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

Exceptions:

1. The assignment of buildings and structures to Tsunami*Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.
2. Free standing parking garages <u>not used for the storage of emergency services vehicles, and not providing means of egress for buildings or structures assigned to a higher risk category,</u> shall be assigned to *Risk Category II.*

Committee Reason: Approved as modified as the proposal addresses a needed item not currently clear in the code relative to the Risk Category for free standing parking garages. The modification adds clarity to the to exception #2 in section 1604.5. (Vote: 13-1)

Final Hearing Results

S71-22	AM

S72-22

Original Proposal

IBC: TABLE 1604.5

Proponents: Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (AFATTAH@SANDIEGO.GOV)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for*Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load. The floor area for vehicular drive aisles shall be permitted to be excluded in the determination of net floor area in parking garages.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason: The proposed code change is necessary to clarify the determination of occupant load in parking garages when establishing the total occupant load in a building for purposes of assigning the Risk Category. Table1604.5 assigns risk categories based on the occupant load in an occupancy or the building. Parking garages are classified as occupancy Group S-2 and footnote (a) to the table permits the use of floor area net to determine the total occupant load used in assigning the Risk Category.

- The IBC defines floor area net as "[BE] FLOOR AREA, NET. The actual occupied area not including unoccupied accessory areas such as corridors , stairways , ramps , toilet rooms, mechanical rooms and closets."
- Aisle is also defined as "[BE] AISLE. An unenclosed exit access component that defines and provides a path of egress travel"

While occupants use drive aisles to access parked motor vehicles they are not commonly identified as AISLE based on the definition. The proposed code change modifies footnote (a) to clarify that floor area for drive aisles can be deducted when determining net floor area for the assignment of Risk Category. Unlike mechanical access parking garages, vehicular aisles are an integral part for the functioning the of the garage and occupants in the motor vehicle would not be located concurrently within the drive aisle. Additionally, drive aisles are not commonly associated with exit access aisles.

There can be situations where a public assembly such as a multiplex cinema or an amenity space for a residential community may be located above a parking structure serving that amenity space and other surrounding buildings. The occupant load in the parking garage itself which is accessory to the public assembly or other buildings may requiring the structure to be assigned to Risk Category III merely due to the size of the parking garage.The proposed code change should be considered to be editorial in nature.
The occupant load for parking garages is determined based on an occupant load factor of 200 sq ft per occupant gross. there are circumstances when even deducting drive aisles and the other items permitted to establish an occupant load based on net area the total occupant load can still exceed 5,000.The occupancy for parking garages is classified as a Group S-2 light hazard storage area and the occupant load density tends to be low due to the intermittent nature of the storage occupancy.

- It is hard to imagine that a large parking garage will have 5,000 occupants simultaneously entering or exiting a garage concurrent with the occurrence of a major earthquake.
- From experience large structures may experience partial damage or collapse but the entire structure should not collapse.

The Commentary to ASCE 7 states "Classification continues to reflect a progression of the anticipated seriousness of the consequence of failure from lowest risk to human life (Risk Category I) to the highest (Risk Category IV)." It is therefore reasonable to assign free standing parking structures to Risk Category II.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change is editorial and can be considered to reduce the cost of construction in jurisdiction that do not permit the deduction of the floor area in drive aisle. Proponent feels the code change will neither increase nor decrease the cost of construction and merely adds a clarification to footnote (a).

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this provides reasonable guidance to determine the occupant load for a parking garage.
(Vote: 12-2)

Final Hearing Results

S72-22	AS

S74-22

Original Proposal

IBC: TABLE 1604.5

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. ~~Group I-2, Condition 1 occupancies with 50 or more care recipients~~. ~~Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities~~. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]
IV	Buildings and other structures designated as essential facilitiesand buildings where loss of function represents a substantial hazard to occupants, including but not limited to: Group I-2 occupancies~~, Condition 2 occupancies having emergency surgery or emergency treatment facilities.~~ Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for*Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities**soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening**where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses *medical care* facilities assigned to Group I-2.Many design professionals assume all hospitals, typically assigned to Group I-2, are already assigned to RC IV, but that is only true for facilities that provide emergency surgery or emergency treatment. (Even "in-patient stabilization," which is part of what defines Group I-2 Condition 2, does not currently qualify for RC IV.) Many Group I-2 facilities, which include hospitals, nursing homes, and detoxification facilities, are assigned to RC II or RC III, even though they provide **24-hour *medical care*** for patients who are***incapable of self-preservation***, and even though they are already required to meet special design requirements for corridors, egress plans, etc. in Section 407. Under the current code, Group I-2 facilities with fewer than 50 patients are not even assigned to RC III.

Because of the specialized nature of the care provided, the vulnerability of the patients, and the special design features, none of which would be available in typical RC II buildings, no Group I-2 facility designed under the current code could reasonably be expected to provide or relocate its normal services in a timely fashion after a design-level storm or earthquake. Therefore, this proposal reassigns all Group I-2 facilities to RC IV.

Despite this reassignment, this proposal is measured in its scope.**It does NOT affect:**

- Medical care facilities for 5 or fewer residents. Per Section 308.3, Group I-2 applies only to larger facilities.
- Any *medical care* facility eligible for design under the IRC.
- Outpatient or *ambulatory care facilities* (even those subject to Section 422), including "urgent care" businesses, dialysis centers, dentists, optometrists, or similar clinics; these are typically Group B. (Ambulatory care facilities with emergency surgery or emergency treatment facilities are already assigned to RC IV.)
- Pharmacies or drug stores, typically Group M.
- Medical office buildings, typically Group B.Medical supply or equipment manufacturers, warehouses, or stores.**This proposal is consistent with current IBC principles.** This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a "life safety" code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC's purpose is broader than just "life safety." Section 101.3 states that the purpose of the IBC is to provide a "reasonable level of safety, **health and general welfare**." So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both "reasonable" and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they "remain operational," the IBC is already more than a safety code. It is, in fact, already a basic "functional recovery" code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

Not all of the IBC's tools are perfectly nuanced. Some involve bright lines and broad categories, and it is sometimes necessary to err on the conservative side. So even if a certain use is not quite as "essential" as a fire station, RC IV might still be a more appropriate choice than RC II or RC III, and in these cases, it is consistent with the code to assign buildings to the higher category. In time, design criteria should evolve to address more specific recovery objectives (FEMA, 2020; FEMA-NIST, 2021). But those nuanced provisions are *at least* a decade away. For now, however, RC IV is the most appropriate tool we have, and we ought to use it. Adapting existing practices to new objectives is entirely consistent with the history of code development.

IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

Bibliography: Almufti, I. et al. (2016). "The resilience-based design of 181 Fremont Tower," *Structure*, June.
Bade, M. (2014). "Mission Bay Block 25 Building – An Exercise in Lean Target Value Design," Presentation to the Lean Construction Institute, Finland, April 12.

Berkowitz, R. (2021). "UCSF Center for Vision Neuroscience," 2021 EERI Annual Meeting, Session 3B, March 24.

CISA, 2020. "Guidance on the Essential Critical Infrastructure Workforce: Ensuring Community and National Resilience in COVID-19 Response (Version 2.0)." U.S. Department of Homeland Security, Cybersecurity & Infrastructure Security Agency, March 28.

FEMA (2020b). *NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, Volume II: Part 3 Resource Papers*, 2020 Edition, FEMA P-2082-2, prepared by the Building Seismic Safety Council of the National Institute of Buildings Sciences for Federal Emergency Management Agency, September.

FEMA-NIST (2021). *Recommended Options for Improving the Built Environment for Post-Earthquake Reoccupancy and Functional Recovery Time*, FEMA P-2090 / NIST SP-1254, Federal Emergency Management Agency and National Institute of Standards and Technology, January.

Mar, D. (2021). "Making Resilience Affordable," 2021 EERI Annual Meeting, Session 3B, March 24.

SEFT Consulting Group (2015). "Beaverton School District Resilience Planning for High School at South Cooper Mountain and Middle School at Timberland," SEFT Consulting Group, July 10.

SFDPH, 2020. "Order of the Health Officer No. C19-07b." City and County of San Francisco, Department of Public Health, March 31, et seq

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don't change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility's nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don't suddenly look like a hospital just because the risk category has changed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal fills a need for Group I-2 facilities for those who are incapable of self-preservation. The committee expressed concerns on how the proposal may affect smaller facilities. (Vote: 8-6)

Public Comments

Public Comment 2

Proponents: Heidi Tremayne, Executive Director, Earthquake Engineering Research Institute, Earthquake Engineering Research Institute (heidi@eeri.org) requests As Submitted

Commenter's Reason: I would like to express **SUPPORT** for the code change proposal S74-22 on behalf of the Earthquake Engineering Research Institute (EERI). This proposal exemplifies EERI's vision by recommending a clear and important action to improve the International Building Code. Once adopted, this code change will improve the seismic performance of new medical care facilities assigned to Occupancy Group I-2, in alignment with recommendations from EERI's published policy statements. Thank you for considering EERI's position on this important code issue.
EERI's formal letter of support can be downloaded at:https://www.cdpaccess.com/public-comment/3341/27368/files/download/3611/EERI-SUPPORT-for-ICC-Code-Change-Proposal-S74-22-final-2022-06-17.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
Same as original proposal.

Final Hearing Results

S74-22	AS

S75-22

Original Proposal

IBC: TABLE 1604.5

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3, Condition 1 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]
IV	Buildings and other structures designated as essential facilities and buildings where loss of function represents a substantial hazard to occupants, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Group I-3 occupancies other than Condition 1. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities**soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening**where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses detention facilities with special security needs, where occupants depend on facility staff for safety and habitability. Group I-3 buildings, currently assigned to RC III, include jails, prisons, and similar facilities in which six or more people are held **"under restraint [and] generally *incapable of self-preservation*."** Group I-3 facilities are also subject to special design requirements in Section 408 for means of egress, fire safety, guard stations, glazing, door mechanisms, etc., making them **essentially unique within a community**. This proposal represents the best way to use current code tools to ensure that a new detention facility will actually be available to serve the community in the days and weeks after a major storm or earthquake.

Existing jails and prisons have a record of life-threatening failures after recent hurricanes (Omorogieva, 2018). So do other old buildings, but the risk to restrained occupants is obviously higher – so much so that it can violate constitutional rights and impose liability on local governments (Jones v. San Francisco, 1997; Omorogieva, 2018). Even if the structure remains safe from collapse – the objective of both RC II and RC III – the loss of power and damage to MEP, communications, and security systems can leave the facility non-functional and, for restrained occupants, uninhabitable to the point of violation (Jones v. San Francisco, 1997). The concern has prompted a current bill in the U.S. Senate seeking information on the preparedness and damage costs in federal correctional facilities after major disasters (S.4748, 2020). The IBC should ensure that new jails and prisons are not adding to the problem.

RC III design provisions for nonstructural systems are the same as for RC II. Most jails and prisons do have emergency plans, and IBC Section 408.4.2 does require emergency power for certain doors and locks. But those strategies are focused on short-term outages or emergency response; they typically do not consider the effects of a long-term outage due to inevitable storm or earthquake damage. Many emergency plans assume feasible evacuation. But pre-event evacuation is only possible for trackable storms, not for earthquakes. Evacuation also comes with high costs and security concerns, requires a facility to evacuate to, and makes no provision for return to a damaged building. Better design can, and should, help solve this problem.

This proposal reassigns four of the five Conditions under Group I-3 to RC IV. Except for Condition 1, which this proposal leaves in RC III, all Group I-3 facilities have **egress and free movement impeded by locks**, rendering the occupants incapable of self-preservation. Because of this restraint, the uniqueness of Group I-3 facilities, and the implications of long repair times, Risk Category IV is appropriate.

Despite this reassignment, this proposal is measured in its scope.**It does NOT affect:**

- Group I-3, Condition 1. These facilities do allow free movement for occupants and are even eligible for design as residential occupancies. (One might argue that these do not even need to be assigned to RC III, but a change to RC II is outside the scope of this proposal.)

- Facilities with fewer than 6 people under restraint. Per Section 308.4, Group I-3 applies only to larger facilities. This would exempt typical holding cells in small court facilities.
- Halfway houses assigned to Group I-1 or R-4. (The difference between “halfway houses,” listed in Sections 308.2 and 310.5, and “prerelease centers,” listed in Section 308.4, is unclear.)

This proposal is consistent with current IBC principles. This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a “life safety” code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC’s purpose is broader than just “life safety.” Section 101.3 states that the purpose of the IBC is to provide a “reasonable level of safety, **health and general welfare**.” So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both “reasonable” and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they “remain operational,” the IBC is already more than a safety code. It is, in fact, already a basic “functional recovery” code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

Not all of the IBC’s tools are perfectly nuanced. Some involve bright lines and broad categories, and it is sometimes necessary to err on the conservative side. So even if a certain use is not quite as “essential” as a fire station, RC IV might still be a more appropriate choice than RC II or RC III, and in these cases, it is consistent with the code to assign buildings to the higher category. In time, design criteria should evolve to address more specific recovery objectives (FEMA, 2020; FEMA-NIST, 2021). But those nuanced provisions are *at least* a decade away. For now, however, RC IV is the most appropriate tool we have, and we ought to use it. Adapting existing practices to new objectives is entirely consistent with the history of code development.

IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

Bibliography: Almufti, I. et al. (2016). “The resilience-based design of 181 Fremont Tower,” *Structure*, June.
Bade, M. (2014). “Mission Bay Block 25 Building - An Exercise in Lean Target Value Design,” Presentation to the Lean Construction Institute, Finland, April 12.

Berkowitz, R. (2021). “UCSF Center for Vision Neuroscience,” 2021 EERI Annual Meeting, Session 3B, March 24.

CISA, 2020. “Guidance on the Essential Critical Infrastructure Workforce: Ensuring Community and National Resilience in COVID-19 Response (Version 2.0).” U.S. Department of Homeland Security, Cybersecurity & Infrastructure Security Agency, March 28.

FEMA (2020b). *NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, Volume II: Part 3 Resource Papers*, 2020 Edition, FEMA P-2082-2, prepared by the Building Seismic Safety Council of the National Institute of Buildings Sciences for Federal Emergency Management Agency, September.

FEMA-NIST (2021). *Recommended Options for Improving the Built Environment for Post-Earthquake Reoccupancy and Functional Recovery Time*, FEMA P-2090 / NIST SP-1254, Federal Emergency Management Agency and National Institute of Standards and Technology, January.

Jones v. San Francisco, 1997. Arnold Jones et al. v. City and County of San Francisco, et al., 976 F.Supp. 896, July 18.

Mar, D. (2021). “Making Resilience Affordable,” 2021 EERI Annual Meeting, Session 3B, March 24.

Omorogieva, W., 2018. “Prison Preparedness and Legal Obligations to Protect Prisoners During Natural Disasters.” Sabin Center for Climate Change Law, Columbia Law School, May.

S.4748, 2020. “Correctional Facility Disaster Preparedness Act of 2020” [S.4748].

SEFT Consulting Group (2015). “Beaverton School District Resilience Planning for High School at South Cooper Mountain and Middle School at Timberland,” SEFT Consulting Group, July 10.

SFDPH, 2020. “Order of the Health Officer No. C19-07b.” City and County of San Francisco, Department of Public Health, March 31, et seq

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don’t change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility’s nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don’t suddenly look like a hospital just because the risk category has changed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as it is important to keep detention facilities with security needs operational as an essential facility. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Heidi Tremayne, Executive Director, Earthquake Engineering Research Institute, Earthquake Engineering Research Institute (heidi@eeri.org) requests As Submitted

Commenter's Reason: I would like to express SUPPORT for the code change proposal S75-22 on behalf of the Earthquake Engineering Research Institute (EERI). This proposal exemplifies EERI’s vision by recommending a clear and important action to improve the International Building Code. Once adopted, this code change will improve the seismic performance of new detention facilities with special security needs assigned to Occupancy Group I-3, in alignment with recommendations from EERI’s published policy statements. Thank you for considering EERI’s position on this important code issue.

EERI's formal support letter can be viewed at:https://www.cdpaccess.com/public-comment/3343/27372/files/download/3612/EERI-SUPPORT-for-ICC-Code-Change-Proposal-S75-22-final-2022-06-17.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
Same as original proposal.

Final Hearing Results

S75-22	AS

S76-22

Original Proposal

IBC: TABLE 1604.5

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. ~~Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public~~<u>Public</u> utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]
IV	Buildings and other structures designated as essential facilities<u>and buildings where loss of function represents a substantial hazard to occupants or users</u>, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. <u>Public utility facilities providing power generation, potable water treatment, or wastewater treatment</u>. Power-generating stations and other public utility facilities required as emergency backup facilities for*Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason: This proposal improves consistency in the assignment of risk categories. It applies current thinking from IBC Chapters 3 and 4 to the risk category assignments in Table 1604.5. The logic of the proposal is as follows:

1. **Risk Category IV is the IBC's main tool to provide functional facilities** soon after a natural hazard event (earthquake, flood, snow, or wind). In terms of post-event functionality, there is a wide gap between RC II-III facilities (which have identical requirements for nonstructural systems) and RC IV facilities. The difference in expected recovery time can be on the order of weeks or months.
2. The performance gap between RC II-III and RC IV is most acute for occupancies that depend on functional nonstructural systems and special design provisions to serve vulnerable users.
3. Because these facilities are rare and specially designed, their services and occupants cannot be quickly relocated to other buildings.
4. Therefore, facilities with special design features and vulnerable users should be strong candidates for Risk Category IV.

Following this logic, this proposal expands the scope of RC IV from just "essential facilities" to include "buildings where loss of function represents a substantial hazard." **This "substantial hazard" can even be life threatening** where, for example, a 24-hour medical facility, residential care facility, public water or power utility, detention center with impeded egress, or critical supply chain facility is out of service for weeks. The code defines *essential facilities* as those that need to "remain operational" through and after an "extreme" earthquake, flood, wind, or snow event. The additional facilities described by the logic above and considered in this proposal might not require continuous operation, but **prolonged downtime – which can be expected from RC II design criteria – can give rise to a similar risk for vulnerable users**, if not on Day 1 after the event, then possibly by Day 3, 10, or 30.

This proposal addresses buildings that support the operations of public utilities. Under the current code, utility buildings that support power generation and water treatment are mostly assigned to RC III even though their value and function is closely linked to the performance of specialized nonstructural components. Only those that provide "emergency backup facilities" for other RC IV facilities are themselves assigned to RC IV.

Instead of drawing a line between normal operations and "emergency backup," this proposal makes the distinction between public utilities (typically designated not by the code but by a state or local commission) and other utilities. If housing, schools, offices, shops, and all the other normal buildings assigned to RC II are to be unusable for prolonged periods after a major storm or earthquake, it should not be because of a failure at a public water or power utility. On the contrary, a policy that expects people to "shelter in place" for weeks or longer in damaged but occupiable buildings should, at the very least, supply those buildings with water and power within at most a few days.

Further, those who would argue that RC IV design for more buildings should be voluntary must acknowledge that no developer would do that voluntary work until reliable utility services are in place. Otherwise, the voluntary work would be wasted as long as a utility outage continues.

Therefore, this proposal makes the key distinction between public water and power utilities and other utilities as follows:

- It maintains the "emergency backup" utilities in RC IV, with no change to the current code.
- It moves public utility facilities for power generation, potable water, and wastewater from RC III to RC IV.
- It maintains the broad assignment of the remaining public utilities to RC III, essentially as in the current code. In some jurisdictions, these "other public utilities" (in the current code's phrasing) might include communications or public transit facilities, but it is the fact that they are designated as public utilities that qualifies them for design consideration beyond RC II.

Despite this reassignment, this proposal is measured in its scope. **It does NOT affect** any non-public utility or any utility supply chain facility not already included in the current RC III provision.

(The current wording of Table 1604.5 regarding utilities is unclear in several ways, but clarifying or correcting it is outside the scope of this proposal. Examples of unclear wording include: Is it assumed that all power generation and water treatment facilities *are* public utilities? Is a solar installation that returns power to the grid considered "power generation"? Are power distribution facilities included with "power generating stations"? What "other" utility functions does the code expect to be assigned to RC III? Why would public utilities be considered *backup* for private facilities, rather than the primary service? And if there is no backup, shouldn't the primary service be assigned to RC IV as well? How many public utilities serve only RC IV facilities, but not the broader community? Etc.)

This proposal is consistent with current IBC principles. This proposal extends the current scope of Risk Category IV, but it does so consistent with the purpose, philosophy, and normative goals the IBC already represents.

Even if you think of the IBC as strictly a "life safety" code, safety is more than mere survival, and safety can be at risk even after the rain, snow, or ground shaking has stopped. If building damage affects the safety of vulnerable users in the following days or weeks, it is consistent with even a safety-based code to manage those risks through design.

But the IBC's purpose is broader than just "life safety." Section 101.3 states that the purpose of the IBC is to provide a "reasonable level of safety, **health and general welfare**." So a focus on the health and welfare of vulnerable building users, even where their building provides immediate safety, is both "reasonable" and completely consistent with the purpose of the code.

With its definition of *essential facilities* and its use of Risk Category IV to ensure they "remain operational," the IBC is already more than a safety code. It is, in fact, already a basic "functional recovery" code; the only question is which building uses, and users, we decide should qualify for a designed recovery. Where RC II or RC III is not reliable enough, it is consistent with the purpose and scope of the IBC to assign more building uses to RC IV.

Not all of the IBC's tools are perfectly nuanced. Some involve bright lines and broad categories, and it is sometimes necessary to err on the conservative side. So even if a certain use is not quite as "essential" as a fire station, RC IV might still be a more appropriate choice than RC II or RC III, and in these cases, it is consistent with the code to assign buildings to the higher category. In time, design criteria should evolve to address more specific recovery objectives (FEMA, 2020; FEMA-NIST, 2021). But those nuanced provisions are *at least* a decade away. For now, however, RC IV is the most appropriate tool we have, and we ought to use it. Adapting existing practices to new objectives is entirely consistent with the history of code development.

IBC Chapters 3 and 4 define and provide special requirements to manage fire and egress risks for particular groups of users. Table 1604.5 is meant to do the same for rare natural hazard events. But while Chapters 3 and 4 consider dozens of specific building uses and conditions, Table 1604.5 has only four categories. Changing the scope of Risk Category IV to account for specific building uses that are not adequately served by RC II or RC III criteria is consistent with the detailed, use-specific approach of Chapters 3 and 4.

Table 1604.5 represents public policy about what we desire from our buildings. As such, it has changed over time, along with public expectations. As we consider new or increasing risks related to more frequent natural hazard events, urbanization, the pandemic, or aging populations, it is both appropriate and consistent with past practice for Table 1604.5 to evolve as well.

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Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction for the buildings newly assigned to RC IV. The largest increases will likely be in high seismic areas where assignment to RC IV makes the largest changes to structural and nonstructural design criteria. This does not mean, however, that every RC IV facility will have the same unit cost as a new state-of-the-art hospital. On the contrary, case studies of voluntary

RC IV-like seismic design have found a **construction cost premium ranging typically from 0% to 2%** relative to normal RC II designs. (See proposal references by Almufti, Bade, Berkowitz, Mar, and SEFT.) This estimate stands to reason: Wind, snow, and earthquake loads can already vary significantly within a jurisdiction, but the building designs and unit costs don't change wildly from one side of the county to the other. For example, the seismic design force in Berkeley is about 1.5 times that in downtown San Francisco; so with respect to the structure, any nursing home or grocery store you can build as RC II in Berkeley you can also build as RC IV in San Francisco with no change to the design. The same is likely true for snow design, for example, in Vail v. Boulder and for wind design in Galveston v. the west side of Houston. On the nonstructural side, a facility's nonstructural systems might need more bracing or support when assigned to RC IV, but the number and size of the components themselves don't suddenly look like a hospital just because the risk category has changed.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

Portions of table not shown remain unchanged.

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other publicPublic utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities and buildings where loss of function represents a substantial hazard to occupants or users, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Public utility facilities providing power generation, potable water treatment, or wastewater treatment. Power-generating stations and other public utility facilities required as emergency backup facilities for*Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the*International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Committee Reason: Approved as modified as the proposal makes the appropriate distinction between facilities for Risk Category III and IV. For lucidity, the modification restores the current wording for Risk Category III. (Vote: 10-4)

Final Hearing Results

S76-22 AM

S79-22

Original Proposal

IBC: 1604.5, TABLE 1604.5

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

Exception: The assignment of buildings and structures to Tsunami *Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.

Revise as follows:

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities. *Ground-mounted photovoltaic (PV) panel systems*.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. Power-generating stations with individual power units not smaller than 100 MW, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]

RISK CATEGORY	NATURE OF OCCUPANCY
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating <u>stations</u> and other public utility facilities <u>required for compliance</u> as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Reason: IBC Section 1604.5 and IBC Table 1604.5 are presently silent for assignment of risk category for all types of photovoltaic (PV) installations. This is a serious gap that still exists in the IBC, even as many other PV provisions in the I-codes have matured over several cycles.

The problem this proposal seeks to resolve is confusion and gross inconsistencies regarding the assignment of risk categories for PV projects. With zero guidance in the IBC, AHJs and other code-enforcing authorities are left to make up their own rules and their own policies, based on their own personal opinions and interpretations. While there is broad agreement on several of these topics, there are outlier cases where the most stringent AHJs create interpretations that increase the cost of construction arbitrarily. With a code that is silent, industry stakeholders and permit applicants have no recourse other than to attempt a negotiation at the building department counter with each AHJ or sometimes with each project.

As there are several primary types of structures used to support PV panels, it is a serious gap in the IBC to be entirely silent on assignment of risk category for these primary applications. Justification is provided here for each of the six categories in this proposal. Note these line items are based on the following definitions. The first definition has appeared in several cycles of the IBC.

PHOTOVOLTAIC (PV) PANEL SYSTEM. A system that incorporates discrete photovoltaic panels, that converts solar radiation into electricity, including rack support systems.

During Group A proceedings in 2021, Proposal G193-21 was approved As Submitted, creating two new definitions that are foundational to the assignment of risk category.

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED. An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

Justification by proposal line item is provided as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as Risk Category I (one).

We hope all stakeholders can agree that a ground-mounted PV panel system installed in the back yard behind someone's home does not need to be anything other than Risk Category I (one), as it represents "a low hazard to human life in the event of failure."

2. *Ground-mounted PV panel systems*shall be assigned as Risk Category I (one).

Fundamentally, ground-mounted PV panel systems meet the description of Risk Category I, as they “represent a low hazard to human life in the event of failure.”

Unfortunately, the Solar Energy Industries Association (SEIA) is aware of a broad range of interpretation by local authorities regarding proper assignment of Risk Category for ground-mounted PV panel systems. This is especially true -- and especially impactful -- for large-scale (often referred to as "utility scale") ground-mounted PV facilities. Given the same set of construction drawings, different building department staff can reach different conclusions, based on different rationale. Different building departments have reviewed projects that are fundamentally the same design, and determined it was Risk Category I, or Risk Category II, or Risk Category III. A few reviewers have even claimed the same design should be assigned as Risk Category IV. Owing to this broad range of opinions and beliefs, the solar industry cannot design a large-scale solar facility without first asking the building code official to make this determination, and the design features and associated cost of construction of a solar facility are therefore dependent on individual opinions and beliefs of reviewers. This is far too subjective.

This inconsistency in the assignment of risk category for ground-mounted PV systems is sometimes based on the Risk Category III description that reads: "Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV." Unfortunately, there is no definition in the IBC for “power generating stations,” so it has no distinct meaning and no consistent interpretation. Is a ground-mounted PV system in the back yard of a residential property a “power generating station”?

With no definition found in the IBC, we can search ASCE 7-16 and find Section 15.5.4.1, which states: “Electrical power-generating facilities are power plants that generate electricity by steam turbines, combustion turbines, diesel generators, or similar turbo machinery.” While ASCE 7-16 Table 1.5-1 does not use the term “power generating station” or “electrical power generating station,” the description of Risk Category III includes “Buildings and other structures … with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure.” It is clear that the original intent of “power-generating stations” as Risk Category III structures was based on large power-generating units such as turbines and was never intended to apply to individual PV panel systems that had not yet scaled at the time this language was created.

ASCE 7-16 Commentary C1.5 states in part: "Risk Category III ... has also included structures associated with utilities required to protect the health and safety of a community, including power generating stations and water treatment and sewage treatment plants ...... Failures of power plants that supply electricity on the national grid can cause substantial economic losses and disruption to civilian life when their failures can trigger other plants to go offline in succession. The result can be massive and potentially extended power outage, shortage, or both that lead to huge economic losses because of idled industries and a serious disruption of civilian life because of inoperable subways, road traffic signals, and so forth.”

IMPORTANT: It is extremely important to note there is a fundamental difference between the physical behavior of conventional turbine power plants and PV facilities. For example, if one reactor shuts down at a nuclear power plant, over 1 gigaWatt of power production can be lost at once. The physical behavior of ground-mounted PV facilities is not the same as turbine-based power generating stations. Where failures in PV facilities have been observed – except in the most extreme cases during hurricanes Irma and Maria -- they are typically localized failures that do not shut down the entire plant.

This behavior is described in future ASCE 7-22 Commentary Section C32.5.2.1, which states in part: “Large-scale photovoltaic facilities can cover hundreds of acres of land, yet they are composed of hundreds or thousands of small, structurally independent ‘tables’ of PV panels, each with their own independent foundation system. The PV panels on these independent nonbuilding structures are linked with electrical conductors to central inverters that convert DC power to AC power. Large-scale PV facilities can have dozens to hundreds of independent central inverters. If an electrical fault is detected, only the inverter associated with that fault is shut down, and the remainder of the facility remains operational. The entire PV facility will shut down only if the electrical substation is shut down, or if the system otherwise detects a loss of the AC signal from the grid. Substations and grids are outside the scope of ASCE 7.
While there is little data of tornado strikes on large-scale PV facilities, in two known cases the damage from a tornado strike was isolated to localized damage. These facilities typically remain operational with localized damage. For ground-mounted photovoltaic installations, the effective plan area A_e should be the size of the largest structurally independent nonbuilding structure supporting PV panels.”
Further, PV panel systems are by their nature an intermittent power source. They convert sunlight to electricity, producing power during daylight hours only. Photovoltaic power systems do not cause substantial economic losses and disruption to civilian life when they stop producing power during night-time hours. We acknowledge that the addition of Energy Storage Systems (ESS) is changing this part of the conversation. However, the addition of ESS does not change the fact that where structural failures have occurred in ground-mounted PV panel systems (except as noted), those failures have been localized and did not trigger a complete shut-down of a power plant. Where

electrical faults are detected, individual inverters can shut down portions of a power plant, without any disruption to civilian life. Therefore, they do not meet the IBC or ASCE 7 criteria for Risk Category III.

There are other considerations that have been brought up for discussion.

Some AHJs have expressed an opinion that ground-mounted PV systems can be assigned as Risk Category I only if they are enclosed by a fence. While most large-scale PV facilities are in fact enclosed within a fence, they are simply not facilities open to the public. They can be accessed only by authorized personnel, who are keenly aware of behavioral conditions during weather events. It is not rational to assign an increased risk category and associated increase in cost of construction to protect possible trespassers. In a different case, with small projects located at school sites, there could be provisions for keeping students and other unauthorized people away from PV systems, but this is independent of the assignment of risk category.

In another deviation from the norm, at least one AHJ requires an increase of risk category based on proximity to highways, schools, or residential developments, with an apparent rationale that a dislodged PV panel could become airborne and cause injury at some distance away from the PV facility after being carried by high winds. In this case, the concern of the AHJ is one failure mode only – panel dislodgement. It would be far more rational to refer to Failure Modes and Effects (FMEA) analysis to focus on the root cause of that one failure mode, and to then solve the problem directly. It is not rational to use a very indirect approach of arbitrarily increasing the risk category of the entire facility because of concern about one failure mode, thereby increasing the structural loads and increasing the cost of the PV facility – perhaps without even solving the problem.

It is true that dislodgement of PV panels has been observed in some cases. It is also true that dislodgement of PV panels has led to progressive failure, as observed in at least one catastrophic failure during a hurricane event. Focused work is underway today to address that identified risk. Attachment of PV panels to the superstructure is being considered by the recently formed ASCE Solar PV Structures Committee. Recommendations are expected to be published in the future Manual of Practice. This is a problem to be solved that is independent of assignment of risk category.

There are other factors that have been identified in forensic studies, which are usually conducted under Non-Disclosure Agreements (NDAs). Work is underway to gather data that can be anonymized and aggregated, in an effort of continual improvement. Some of this work is being funded under a grant by the U.S. Department of Energy. Members of the structural engineering community who are deeply involved in solar projects are engaged in these efforts.

There are other factors that can contribute to increased reliability and resilience of PV facilities. For example, better consideration of gust effect factor and topographic factors; and a growing knowledge base from boundary layer wind tunnel studies; as well as design, specification, installation, and maintenance of components. It is both more rational and more economical to focus directly on resolving specific issues. It is not rational to believe we can increase risk category and wind loads until problems are nonexistent.

For any situation where project owners or financiers desire enhanced performance beyond code-minimum provisions for safety, a performance factor could be developed to voluntarily increase structural loads, but this should be independent of code-prescribed assignment of risk categories or methods for determining minimum structural loads.

3. *Elevated PV support structures* other than those described in Items 4 and 6 shall be assigned as Risk Category II (two).

The newly defined term for elevated PV support structures will make it easier to clarity the assignment of risk category. Elevated PV support structures are often constructed on the ground surface over parking spaces. In this application, the elevated PV support structures are not using any space that is not already used as a parking lot, and they provide the added benefit of providing shade for vehicles. Elevated PV support structures can also be constructed on the ground surface to provide shade for other uses, such as picnic areas. In all of these cases other than described in Items 4 and 6, elevated PV support structures meet the criteria and intent for Risk Category II.

There are also some emerging agricultural uses, sometimes referred to as “agri-voltaics.” As one example, elevated PV support structures have been built over cranberry bogs. Although there could be an exception for agricultural use, for simplicity this proposal is not seeking to treat agricultural uses differently than the more-common installations assigned as Risk Category II.

4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.

This concept is widely accepted by industry and AHJs and should not be controversial. Where PV panel systems are mounted on building roofs, whether attached or unattached, they shall be assigned as the same risk category as the building on which they are mounted. Elevated PV support structures have been installed on top of buildings along with vegetative roof features, and on top of parking garages over parking spaces. In any of these cases, PV structures must be designed to at least the same risk category as the building on which they are installed.

5. *PV panel systems* and *elevated PV support structures paired* with *energy storage systems (ESS)*and serving as a dedicated, stand-alone source of backup power for Risk Category IV (four) buildings shall be assigned as Risk Category IV (four).

The intermittent nature of power generation makes PV panel systems and elevated PV support structures an extremely unlikely choice as an on-site, sole source of required emergency backup power for a Risk Category IV structure. We believe most essential services facilities are still using fuel-powered (usually diesel) generators and a stock of fuel for backup power. However, with increasing adoption of Energy Storage Systems (ESS), it is conceivable that PV paired with ESS could be a sole source of required backup power.

Where PV plus ESS is the only direct source of backup power for an essential services facility – with a transfer switch or other equipment enabling it to operate independently from the grid during a time of grid power outage – it shall be assigned as Risk Category IV. If PV plus ESS is not designed to operate in the event of grid power outage, then it need not be Risk Category IV. This assignment of risk category can also apply when power switching enables the use of either the PV + ESS or a generator interchangeably.

6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as Risk Category IV (four).

There could be cases where elevated PV support structures are installed on the same site as a Risk Category IV building, over surface parking spaces that are designated for emergency services vehicles. Whether or not those elevated PV support structures are serving as part of a backup power source (as in Item 5), the elevated PV support structures must be assigned as Risk Category IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Where ground-mounted PV panel systems are already designed and constructed as Risk Category I (one), this proposal will neither increase nor decrease the cost of construction. Where additional clarity is provided by this proposal, there could be projects where the cost of construction is decreased.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved based on the proponent request based on previous committee actions. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities. Certain temporary facilities. Minor storage facilities. *Ground-mounted photovoltaic (PV) panel systems*.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.

RISK CATEGORY	NATURE OF OCCUPANCY
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. Buildings and other structures containing Group E or Group I-4 occupancies or combination therof, with an occupant load greater than 250. Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. Group I-2, Condition 1 occupancies with 50 or more care recipients. Group I-2, Condition 2 occupancies not having emergency surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000[a]. Power-generating stations with individual power units not smaller than 100 MW rated $75MW_{AC}$ or greater, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b]
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2, Condition 2 occupancies having emergency surgery or emergency treatment facilities. Ambulatory care facilities having emergency surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required for compliance as emergency backup facilities for *Risk Category* IV structures. Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code* ; and Are sufficient to pose a threat to the public if released.[b] Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.5 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided that it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

Commenter's Reason: ASCE 7-22 Section 15.5.4 states: “Electrical power-generating facilities are power plants that generate electricity by steam turbines, combustion turbines, diesel generators, or similar turbomachinery.” Commentary to Section 15.5.4 states: “Electrical power plants closely resemble building structures, and their performance in seismic events has been good.”
It is clear that IBC Table 1604.5 and ASCE Section 15.5.4 were not written with renewable energy facilities in mind. The term "power generating station" is undefined and ambiguous in the 2021 IBC, and it has no threshold assigned to it. This PC seeks to establish a threshold on the term "power generating station" that is consistent with the original intent of the term in the IBC and in ASCE 7.

Note 75 MWac is a better threshold than 100 MW for the smallest power-producing unit of a power generating station, as 75 MW is established in North American Electric Reliability Corporation Docket No. RR15-4-000, Order on Electric Reliability Organization Risk Based Registration Initiative and Requiring Compliance Filing (Issued March 19, 2015). The smallest power-producing unit of a renewable energy facility could be considered as one inverter, or could be one wind turbine.

Bibliography: North American Electric Reliability Corporation Docket No. RR15-4-000
ORDER ON ELECTRIC RELIABILITY ORGANIZATION RISK BASED REGISTRATION INITIATIVE AND REQUIRING COMPLIANCE

FILING

(Issued March 19, 2015)
https://www.ferc.gov/sites/default/files/2020-05/E-3_18.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The net effect of PC and original code change proposal is no change in cost, as it formalizes the assignment of RC for the vast majority of renewable energy facilities.

Final Hearing Results	
S79-22	AMPC1

S80-22

Original Proposal

IBC: 1604.5.1

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, <u>or provides required electrical, communications, mechanical, plumbing, or conveying support to another portion assigned to Risk Category IV,</u> both portions shall be assigned to the higher *risk category*.

> **Exception:** Where a *storm shelter* designed and constructed in accordance with ICC 500 is provided in a building, structure or portion thereof normally occupied for other purposes, the *risk category* for the normal occupancy of the building shall apply unless the *storm shelter* is a designated emergency shelter in accordance with Table 1604.5.

Reason: This proposal ensures that a building assigned to Risk Category IV will have all the building systems and services it needs to actually perform like a RC IV building, without relying on another portion of the building designed only as RC II. It extends the application of a current provision (Section 1604.5.1) to buildings with RC IV uses.
Current IBC Section 1604.5.1 already says that a building with multiple uses can have multiple risk categories under certain conditions. The question is: If Portion A of a new building would be assigned to RC IV, when can Portion B be assigned to only RC II or III? The current provision says that can happen when all four of the following are true:

- Portion B is “structurally separated” from Portion A.
- Portion B does *not* provide required access to Portion A.
- Portion B does *not* provide required egress for Portion A.
- Portion B does not “share” any “life safety components” with Portion A. (“Share” is not defined. “Life safety components” is also not defined. It is probably broader than Life Safety Systems, a definition just added to the 2021 IBC.)

Those four conditions are meant to ensure that Portion A can perform adequately, independent of Portion B. But are they enough if Portion A is assigned to Risk Category IV? RC IV facilities need reliable power, HVAC, and functional recovery capacity that is not covered by the four conditions. Therefore, this proposal adds a fifth condition where Portion A is assigned to RC IV.

The phrase “electrical, communications, mechanical, plumbing, or conveying” refers to the requirements of IBC Chapters 27, 28, 29, and 30 respectively. The references are intended be generic, just like the current provision’s references to undefined “life safety components” and to egress, access, and structural separation. As with many IBC provisions, it’s appropriate to leave project specific details to the project team and the code official, in this case to determine which aspects of any of those systems is necessary for the RC IV function in question.

Cost Impact: The code change proposal will increase the cost of construction
The proposal could increase the cost of construction for mixed-use buildings that include RC IV uses, but only in cases that where interpretation of the current code would fail to give proper attention to RC IV performance.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this proposal ensures that a building assigned to Risk Category IV will have all the building systems and services it needs to actually perform like a Risk Category IV building, without relying on another portion of the building designed only as Risk Category II. (Vote: 14-0)

Final Hearing Results

S80-22	AS

S81-22

Original Proposal

IBC: 1604.5, 1604.5.1, 1604.5.2 (New)

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a *risk category* be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

Exception: The assignment of buildings and structures to Tsunami *Risk Categories* III and IV is permitted to be in accordance with Section 6.4 of ASCE 7.

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, both portions shall be assigned to the higher *risk category*.

Exception: Where a *storm shelter* designed and constructed in accordance with ICC 500 is provided in a building, structure or portion thereof normally occupied for other purposes, the *risk category* for the normal occupancy of the building shall apply unless the *storm shelter* is a designated emergency shelter in accordance with Table 1604.5.

Add new text as follows:

1604.5.2 Photovoltaic (PV) panel systems. *Photovoltaic (PV) panel systems* and *elevated PV support structures* shall be assigned a *risk category* as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as *Risk Category* I.
2. *Ground-mounted PV panel systems* shall be assigned as *Risk Category* I.
3. *Elevated PV support structures* other than those described in Items 4 and 6 shall be assigned as *Risk Category* II.
4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.
5. *PV panel systems* and *elevated PV support structures* paired with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for *Risk Category* IV buildings shall be assigned as *Risk Category* IV.
6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as *Risk Category* IV.

Reason: IBC Section 1604.5 and IBC Table 1604.5 are presently silent for assignment of risk category for all types of photovoltaic (PV) installations. This is a serious gap that still exists in the IBC, even as many other PV provisions in the I-codes have matured over several cycles.

The problem this proposal seeks to resolve is confusion and gross inconsistencies regarding the assignment of risk categories for PV projects. With zero guidance in the IBC, AHJs and other code-enforcing authorities are left to make up their own rules and their own policies, based on their own personal opinions and interpretations. While there is broad agreement on several of these topics, there are outlier cases where the most stringent AHJs create interpretations that increase the cost of construction arbitrarily. With a code that is silent, industry stakeholders and permit applicants have no recourse other than to attempt a negotiation at the building department counter with each AHJ or sometimes with each project.

As there are several primary types of structures used to support PV panels, it is a serious gap in the IBC to be entirely silent on assignment of risk category for these primary applications. Justification is provided here for each of the six categories in this proposal. Note these line items are based on the following definitions. The first definition has appeared in several cycles of the IBC.

PHOTOVOLTAIC (PV) PANEL SYSTEM. A system that incorporates discrete photovoltaic panels, that converts solar radiation into electricity, including rack support systems.

During Group A proceedings in 2021, Proposal G193-21 was approved As Submitted, creating two new definitions that are foundational to the assignment of risk category.

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED. An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

Justification by proposal line item is provided as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as Risk Category I (one).

We hope all stakeholders can agree that a ground-mounted PV panel system installed in the back yard behind someone's home does not need to be anything other than Risk Category I (one), as it represents "a low hazard to human life in the event of failure."

2. *Ground-mounted PV panel systems* shall be assigned as Risk Category I (one).

Fundamentally, ground-mounted PV panel systems meet the description of Risk Category I, as they "represent a low hazard to human life in the event of failure."

Unfortunately, the Solar Energy Industries Association (SEIA) is aware of a broad range of interpretation by local authorities regarding proper assignment of Risk Category for ground-mounted PV panel systems. This is especially true -- and especially impactful -- for large-scale (often referred to as "utility scale") ground-mounted PV facilities. Given the same set of construction drawings, different building department staff can reach different conclusions, based on different rationale. Different building departments have reviewed projects that are fundamentally the same design, and determined it was Risk Category I, or Risk Category II, or Risk Category III. A few reviewers have even claimed the same design should be assigned as Risk Category IV. Owing to this broad range of opinions and beliefs, the solar industry cannot design a large-scale solar facility without first asking the building code official to make this determination, and the design features and associated cost of construction of a solar facility are therefore dependent on individual opinions and beliefs of reviewers. This is far too subjective.

This inconsistency in the assignment of risk category for ground-mounted PV systems is sometimes based on the Risk Category III description that reads: "Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV." Unfortunately, there is no definition in the IBC for "power generating stations," so it has no distinct meaning and no consistent interpretation. Is a ground-mounted PV system in the back yard of a residential property a "power generating station"?

With no definition found in the IBC, we can search ASCE 7-16 and find Section 15.5.4.1, which states: "Electrical power-generating facilities are power plants that generate electricity by steam turbines, combustion turbines, diesel generators, or similar turbo machinery." While ASCE 7-16 Table 1.5-1 does not use the term "power generating station" or "electrical power generating station," the description of Risk Category III includes "Buildings and other structures … with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure." It is clear that the original intent of "power-generating stations" as Risk Category III structures was based on large power-generating units such as turbines and was never intended to apply to individual PV panel systems that had not yet scaled at the time this language was created.

ASCE 7-16 Commentary C1.5 states in part: "Risk Category III ... has also included structures associated with utilities required to protect the health and safety of a community, including power generating stations and water treatment and sewage treatment plants ...... Failures of power plants that supply electricity on the national grid can cause substantial economic losses and disruption to civilian life when their failures can trigger other plants to go offline in succession. The result can be massive and potentially extended power outage, shortage, or both that lead to huge economic losses because of idled industries and a serious disruption of civilian life because of inoperable subways, road traffic signals, and so forth."

IMPORTANT: It is extremely important to note there is a fundamental difference between the physical behavior of conventional turbine power plants and PV facilities. For example, if one reactor shuts down at a nuclear power plant, over 1 gigaWatt of power production can be lost at once. The physical behavior of ground-mounted PV facilities is not the same as turbine-based power generating stations. Where failures in PV facilities have been observed – except in the most extreme cases during hurricanes Irma and Maria -- they are typically localized failures that do not shut down the entire plant.

This behavior is described in future ASCE 7-22 Commentary Section C32.5.2.1, which states in part: "Large-scale photovoltaic facilities can cover hundreds of acres of land, yet they are composed of hundreds or thousands of small, structurally independent 'tables' of PV panels, each with their own independent foundation system. The PV panels on these independent nonbuilding structures are linked with electrical conductors to central inverters that convert DC power to AC power. Large-scale PV facilities can have dozens to hundreds of independent central inverters. If an electrical fault is detected, only the inverter associated with that fault is shut down, and the remainder of the facility remains operational. The entire PV facility will shut down only if the electrical substation is shut down, or if the system otherwise detects a loss of the AC signal from the grid. Substations and grids are outside the scope of ASCE 7.

While there is little data of tornado strikes on large-scale PV facilities, in two known cases the damage from a tornado strike was isolated to localized damage. These facilities typically remain operational with localized damage. For ground-mounted photovoltaic installations, the effective plan area A_e should be the size of the largest structurally independent nonbuilding structure supporting PV panels."

Further, PV panel systems are by their nature an intermittent power source. They convert sunlight to electricity, producing power during daylight hours only. Photovoltaic power systems do not cause substantial economic losses and disruption to civilian life when they stop producing power during night-time hours. We acknowledge that the addition of Energy Storage Systems (ESS) is changing this part of the conversation. However, the addition of ESS does not change the fact that where structural failures have occurred in ground-mounted PV panel systems (except as noted), those failures have been localized and did not trigger a complete shut-down of a power plant. Where electrical faults are detected, individual inverters can shut down portions of a power plant, without any disruption to civilian life. Therefore, they do not meet the IBC or ASCE 7 criteria for Risk Category III.

There are other considerations that have been brought up for discussion.

Some AHJs have expressed an opinion that ground-mounted PV systems can be assigned as Risk Category I only if they are enclosed by a fence. While most large-scale PV facilities are in fact enclosed within a fence, they are simply not facilities open to the public. They can be accessed only by authorized personnel, who are keenly aware of behavioral conditions during weather events. It is not rational to assign an increased risk category and associated increase in cost of construction to protect possible trespassers. In a different case, with small projects located at school sites, there could be provisions for keeping students and other unauthorized people away from PV systems, but this is independent of the assignment of risk category.

In another deviation from the norm, at least one AHJ requires an increase of risk category based on proximity to highways, schools, or residential developments, with an apparent rationale that a dislodged PV panel could become airborne and cause injury at some distance away from the PV facility after being carried by high winds. In this case, the concern of the AHJ is one failure mode only – panel dislodgement. It would be far more rational to refer to Failure Modes and Effects (FMEA) analysis to focus on the root cause of that one failure mode, and to then solve the problem directly. It is not rational to use a very indirect approach of arbitrarily increasing the risk category of the entire facility because of concern about one failure mode, thereby increasing the structural loads and increasing the cost of the PV facility – perhaps without even solving the problem.

It is true that dislodgement of PV panels has been observed in some cases. It is also true that dislodgement of PV panels has led to progressive failure, as observed in at least one catastrophic failure during a hurricane event. Focused work is underway today to address that identified risk. Attachment of PV panels to the superstructure is being considered by the recently formed ASCE Solar PV Structures Committee. Recommendations are expected to be published in the future Manual of Practice. This is a problem to be solved that is independent of assignment of risk category.

There are other factors that have been identified in forensic studies, which are usually conducted under Non-Disclosure Agreements (NDAs). Work is underway to gather data that can be anonymized and aggregated, in an effort of continual improvement. Some of this work is being funded under a grant by the U.S. Department of Energy. Members of the structural engineering community who are deeply involved in solar projects are engaged in these efforts.

There are other factors that can contribute to increased reliability and resilience of PV facilities. For example, better consideration of gust effect factor and topographic factors; and a growing knowledge base from boundary layer wind tunnel studies; as well as design, specification, installation, and maintenance of components. It is both more rational and more economical to focus directly on resolving specific issues. It is not rational to believe we can increase risk category and wind loads until problems are nonexistent.

For any situation where project owners or financiers desire enhanced performance beyond code-minimum provisions for safety, a performance factor could be developed to voluntarily increase structural loads, but this should be independent of code-prescribed assignment of risk categories or methods for determining minimum structural loads.

3. *Elevated PV support structures* other than those described in Items 4 and 6 shall be assigned as Risk Category II (two).

The newly defined term for elevated PV support structures will make it easier to clarity the assignment of risk category. Elevated PV support structures are often constructed on the ground surface over parking spaces. In this application, the elevated PV support structures are not using any space that is not already used as a parking lot, and they provide the added benefit of providing shade for vehicles. Elevated PV support structures can also be constructed on the ground surface to provide shade for other uses, such as picnic areas. In all of these cases other than described in Items 4 and 6, elevated PV support structures meet the criteria and intent for Risk Category II.

There are also some emerging agricultural uses, sometimes referred to as “agri-voltaics.” As one example, elevated PV support structures have been built over cranberry bogs. Although there could be an exception for agricultural use, for simplicity this proposal is not seeking to treat agricultural uses differently than the more-common installations assigned as Risk Category II.

4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.

This concept is widely accepted by industry and AHJs and should not be controversial. Where PV panel systems are mounted on building roofs, whether attached or unattached, they shall be assigned as the same risk category as the building on which they are mounted. Elevated PV support structures have been installed on top of buildings along with vegetative roof features, and on top of parking garages over parking spaces. In any of these cases, PV structures must be designed to at least the same risk category as the building on which they are installed.

5. *PV panel systems* and *elevated PV support structures paired* with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for Risk Category IV (four) buildings shall be assigned as Risk Category IV (four).

The intermittent nature of power generation makes PV panel systems and elevated PV support structures an extremely unlikely choice as an on-site, sole source of required emergency backup power for a Risk Category IV structure. We believe most essential services facilities are still using fuel-powered (usually diesel) generators and a stock of fuel for backup power. However, with increasing adoption of Energy Storage Systems (ESS), it is conceivable that PV paired with ESS could be a sole source of required backup power.

Where PV plus ESS is the only direct source of backup power for an essential services facility – with a transfer switch or other equipment enabling it to operate independently from the grid during a time of grid power outage – it shall be assigned as Risk Category IV. If PV plus ESS is not designed to operate in the event of grid power outage, then it need not be Risk Category IV. This assignment of risk category can also apply when power switching enables the use of either the PV + ESS or a generator interchangeably.

6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as Risk Category IV (four).

There could be cases where elevated PV support structures are installed on the same site as a Risk Category IV building, over surface parking spaces that are designated for emergency services vehicles. Whether or not those elevated PV support structures are serving as part of a backup power source (as in Item 5), the elevated PV support structures must be assigned as Risk Category IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds clarity for assignment of risk category. The proposal does not increase the cost of construction, and in some cases could decrease the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1604.5.2 Photovoltaic (PV) panel systems. *Photovoltaic (PV) panel systems* and *elevated PV support structures* shall be assigned a *risk category* as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as *Risk Category* I.
2. *Ground-mounted PV panel systems* <u>other than those described in Items 1 and 5</u> shall be assigned as *Risk Category* <u>II</u> I~~.~~

3. *Elevated PV support structures* other than those described in Items 4, 5, and 6 shall be assigned as *Risk Category* II.
4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.
5. *PV panel systems* and *elevated PV support structures* paired with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for *Risk Category* IV buildings shall be assigned as *Risk Category* IV.
6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned as *Risk Category* IV.

Committee Reason: Approved as modified as the proposal provides needed guidance for the determination of Risk Category for PV panel systems. The committee did express concerns that item 6 of section 1604.5.2 could need rewording for clarity. The modification aptly assigns the noted items to Risk Category II. (Vote: 8-5)

Public Comments

Public Comment 3

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1604.5.2 Photovoltaic (PV) panel systems. *Photovoltaic (PV) panel systems* and *elevated PV support structures* shall be assigned to a *risk category* as follows:

1. *Ground-mounted PV panel systems* serving only Group R-3 buildings shall be assigned ~~as~~ to *Risk Category* I.
2. *Ground-mounted PV panel systems* other than those described in items 1 and 5 shall be assigned ~~as~~ to *Risk Category* II.
3. *Elevated PV support structures* other than those described in Items 4, 5, and 6 shall be assigned ~~as~~ to *Risk Category* II.
4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned ~~a~~ to the same *risk category* ~~that is the same~~ as the *risk category* of the building on which they are mounted.
5. *PV panel systems* and *elevated PV support structures* paired with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for *Risk Category* IV buildings shall be assigned ~~as~~ to *Risk Category* IV.
6. *Elevated PV support structures* dedicated to parking of emergency vehicles shall be assigned ~~as~~ to *Risk Category* IV.

Commenter's Reason:

This public comment merely clarifies and confirms the intent of S81 as submitted and as approved by the committee. The only substantive change is the addition of the word "only" in item 1. As noted in the original reason statement, item 1 is intended for cases such as "a ground-mounted PV panel system installed in the back yard behind someone's home." We agree that RC I is appropriate for such cases. However, as written and as approved, one might misinterpret item 1 to include PV systems that serve any number or type of facility, as long as the buildings served include at least one R-3 dwelling. Surely this is not the intent. This public comment removes any confusion by confirming that item 1 applies when the building or buildings served include only such dwellings. One might argue that even this change is different from what the S81 reason statement suggested as the intent. That is, even with the public comment, one might interpret the new provision to allow RC I for ground-mounted systems that serve multiple R-3 dwellings, or even a whole subdivision or small town. That's a far cry from a panel "installed in the back yard." Even so, we are willing to accept this potential interpretation as long as the same system does not also serve commercial, institutional, multi-family residential, or other occupancies. (Note that in the case of a subdivision or other large installation, if it would be regulated as a public utility, the current Table 1604.5 already assigns it to RC III.)

In addition, the comment makes a few editorial corrections for consistency with typical IBC wording: buildings and structures are typically assigned *to* a risk category, not *as* a risk category.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The public comment makes no substantive change to the cost of construction relative to the original proposal as modified by committee.

Public Comment 4

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1604.5.2 Photovoltaic (PV) panel systems. *Photovoltaic (PV) panel systems* and *elevated PV support structures* shall be assigned a *risk category* as follows:

1. *Ground-mounted PV panel systems* serving Group R-3 buildings shall be assigned as *Risk Category* I.
2. *Ground-mounted PV panel systems* other than those described in items 1 and 5 shall be assigned as *Risk Category* II.
3. *Elevated PV support structures* other than those described in Items 4, 5, and 6 shall be assigned as *Risk Category* II.
4. Rooftop-mounted *PV panel systems* and *elevated PV support structures* installed on top of buildings shall be assigned a *risk category* that is the same as the *risk category* of the building on which they are mounted.
5. *PV panel systems* and *elevated PV support structures* paired with *energy storage systems (ESS)* and serving as a dedicated, stand-alone source of backup power for *Risk Category* IV buildings shall be assigned as *Risk Category* IV.
6. *Elevated PV support structures* ~~dedicated to~~ where the usable space underneath is used for parking of emergency vehicles shall be assigned as *Risk Category* IV.

Commenter's Reason: This comment affects only item 6. At the hearings, one Structural Committee member requested a clean-up of this language, and we agree that it's needed for clarity.
The intent of item 6 is to match the intent of current Table 1604.5, which assigns parking facilities for emergency vehicles to RC IV. Elevated PV structures with parking under them should be similarly assigned, even though they are not buildings. As written, however, the word "dedicated" is less clear than just using the terms already used in the definition of "elevated PV support structure." Therefore, this comment replaces the words "dedicated to" with wording from that definition.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
No substantive change relative to the original proposal.

Final Hearing Results

S81-22	AMPC3,4

S82-22

Original Proposal

IBC: 1604.8.2

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1604.8.2 Structural walls. Walls that provide vertical load-bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors and members that provide lateral support for the wall or that are supported by the wall. The connections shall be capable of resisting the horizontal forces <u>that result from the application of the prescribed *loads*. The required earthquake out-of-plane *loads* are</u> specified in Section 1.4.4 of ASCE 7 for walls of structures assigned to *Seismic Design Category* A and to Section 12.11 of ASCE 7 for walls of structures assigned to all other *seismic design categories*. Required anchors in masonry walls of hollow units or *cavity walls* shall be embedded in a reinforced grouted structural element of the wall. See Sections 1609 for wind design requirements and 1613 for earthquake design requirements.

Reason: This proposal clarifies that where wind, lateral earth pressures, or other loads are the dominant lateral in-plane or out-of-plane loads on structural walls that those walls must be anchored to resist those forces. The StEER Hurricane Michael P-VAT report Figure 17 showed Jinks Middle School's gymnasium walls on two sides completely separating and collapsing from the roof they could have been properly anchored to. https://www.weather.gov/media/tae/events/20181010_Michael/StEER_PVAT.pdf

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of wall anchorage where design currently may have incorrectly been ignoring non-earthquake loading.

Public Hearing Results

Committee Action	**Disapproved**

Committee Reason: Disapproved as unnecessary and already covered by section 1604.2. (Vote: 8-5)

Public Comments

Public Comment 1

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov) requests As Submitted

Commenter's Reason: I urge the reader to reference the immediately preceding Section 1604.8.1 to understand where the prescribed loads wording came from and why this is needed. It's currently quite odd that anchorage for uplift and sliding forces needs to be provided to resist the prescribed loads, but then we don't restate that it also applies to lateral support. This proposal fixes that.
Currently we specifically invoke one portion of ASCE 7 for structural wall anchorage to seismic loads. That isn't the full story as many structural walls are governed by wind loads or lateral soil pressure or fluid loads. We need to fix this gap.

The committee's stated rationale is correct that this is already addressed in the general provisions of 1604.2, however this same argument can be made for all of the other items in this anchorage section, so none of them need to be stated. When only seismic loads are invoked in the way they are in the current code section - it leaves the reader with the odd impression that the other types of loads do not need to be considered when designing wall anchorage. This is a dangerous misinterpretation that does occur.

Please overturn the committee's decision so we can have 1604.8.2 align with 1604.8.1 and ensure there isn't any wiggle room out of properly anchoring structural walls.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This anchorage requirement is already present, however if the code is being misinterpreted then this change could increase the cost of construction where proper anchorage of structural walls would now be required.

Final Hearing Results

S82-22	AS

S84-22

Original Proposal

IBC: SECTION 1606, 1606.1, SECTION 1607, 1607.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1606
DEAD LOADS

Revise as follows:

1606.1 General. ~~*Dead loads* are those *loads* defined in Chapter 2 of this code. *Dead loads* shall be considered to be permanent loads~~. Buildings, structures, and parts thereof shall be designed to resist the effects of *dead loads*.

SECTION 1607
LIVE LOADS

Revise as follows:

1607.1 General. ~~*Live loads* are those loads defined in Chapter 2 of this code~~ Buildings, structures, and parts thereof shall be designed to resist the effects of *live loads*.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal revises the General section for both dead loads and live loads to include charging text similar the other load sections in the IBC. Currently the "General" sub-section for both dead and live loads doesn't actually require buildings and structures to be designed for these loads. The proposal corrects this.

The proposed text is based on current text for the other design loads, specifically wind, soil, rain, and earthquake.

The proposal also removes the text pointing to Chapter 2 for the definitions of Dead Load and Live Load. This pointer is unnecessary as Chapter 2 adequately describes how definitions are applied, such pointers are not used elsewhere in the IBC, and defined terms are italized throughout the IBC which by itself is pointer to Chapter 2.

The sentence indicating dead loads are to be considered permanent loads is also deleted as it is unnecessary. The load combination provisions in Section 1605 and the symbol notations in Section 1602.1 no longer refer to permanent or transient conditions. It is also noted that the dead load chapter of ASCE 7 does not refer to dead loads as permanent loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Improving coordination with ASCE 7 and adding charging text is not expected to effect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal aligns Dead Load and Live Load sections of ASCE 7-22 and provides the proper charging language. (Vote: 11-0)

Final Hearing Results

S84-22	AS

S85-22

Original Proposal

IBC: 1607.6, 1607.6.1 (New), TABLE 1607.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.6 Helipads. Landing areas designed for a design basis helicopter with maximum take-off weight of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation. The landing area weight limitation shall be indicated by the numeral "3" (kips) located in the bottom right corner of the landing area as viewed from the primary approach path. The indication for the landing area weight limitation shall be a minimum 5 feet (1524 mm) in height. ~~Helipads shall be designed for the following *live loads*:~~

1. ~~A uniform *live load*, *L*, as specified in Items 1.1 and 1.2. This *load* shall not be reduced.~~
   1.1. ~~40 psf (1.92 kN/m²) where the design basis helicopter has a maximum take-off weight of 3,000 pounds (13.35 kN) or less.~~

   1.2. ~~60 psf (2.87 kN/m²) where the design basis helicopter has a maximum take-off weight greater than 3,000 pounds (13.35 kN).~~

2. ~~A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.~~

3. ~~Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter's two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.~~

~~Landing areas designed for a design basis helicopter with maximum take-off weight of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation. The landing area weight limitation shall be indicated by the numeral "3" (kips) located in the bottom right corner of the landing area as viewed from the primary approach path. The indication for the landing area weight limitation shall be a minimum 5 feet (1524 mm) in height.~~

Add new text as follows:

1607.6.1 Concentrated loads. Helipads shall be designed for the following concentrated *live loads*:

1. A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.

2. Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter's two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
16.	Handrails, guards and grab bars		See Section 1607.9		—
17.	Helipads	Helicopter takeoff weight 3,000 lb (13.35 kN) or less	See Section 1607.6 40	See Section 1607.6.1	Section 1607.6
		Helicopter takeoff weight more than 3,000 lb (13.35 kN)	60	See Section 1607.6.1	Section 1607.6

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal reorganizes both the section on helipads and the live load table entry for helipads to coordinate with the organization in ASCE 7. The reorganization also more closely follows the typical IBC format for live loads by placing the live load value in the live load table itself where ever possible.

This proposal does not change the technical requirements for helipads.

Currently the entry in the live load table for helipads is simply a pointer as it states to See Section 1607.6. This proposal moves the uniform live loads into the Live Load Table as they can be concisely listed in the table by using two rows. The helipad concentrated loads remain in Section 1607 as they have accompanying text that would not fit concisely in the table.

Section 1607.6 is also logically reorganized by adding a subsection. This way the base text addressing the requirements for identification on the helipad are placed first and the concentrated loads are placed in their own subsection.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reorganizing text and improving coordination with ASCE 7 is not expected to effect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the sections are reorganized to coordinate with ASCE 7-22. The committee noted that the provision would allow live load reduction where it is currently not reduceable. (Vote: 10-3)

Public Comments

Public Comment 1

Proponents: Cole Graveen, Self (cwgraveen@rrj.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1607.6 Helipads. Landing areas designed for a design basis helicopter with maximum take-off weight of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation. The landing area weight limitation shall be indicated by the numeral “3” (kips) located in the bottom right corner of the landing area as viewed from the primary approach path. The indication for the landing area weight limitation shall be a minimum 5 feet (1524 mm) in height.

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TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
16.	Handrails, guards and grab bars		See Section 1607.9		—
17.	Helipads	Helicopter takeoff weight 3,000 lb (13.35 kN) or less	40[a]	See Section 1607.6.1	Section 1607.6
		Helicopter takeoff weight more than 3,000 lb (13.35 kN)	60[a]	See Section 1607.6.1	Section 1607.6

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Commenter's Reason: S85-22 was intended to coordinate the organization and format of the helipad live load provisions in the IBC with the 2022 edition of ASCE/SEI 7. There was no intent to change the technical requirements. However, in the modifications to Table 1607.1, when the text "See Section 1607.6" was deleted and replaced with the actual live load values of 40 psf and 60 psf, Footnote a was inadvertently not added next to the live load values. This could be interpreted as a technical change when combined with the text reorganization in Section 1607.6. The text reorganization deleted the numbered items 1 through 3 which included specific text that the live load shall not be reduced.
Again, changing the live load reduction provisions for helipads was not within the intent of S85-22.

This public comment adds Footnote a next to both helipad live load values, 40 psf for helicopters with a takeoff weight of 3,000 lb or less, and 60 psf for helicopters with a takeoff weight more than 3,000 lbs. This footnote is necessary to make it clear that the helipad uniform live load values are not reducible.
Attached to this public comment is the portion of the ASCE 7-22 live load table for helipads for comparison. The ASCE 7-22 live load table no longer uses footnotes, instead there is a column that address live load reduction. In this column, entitled "Live Load Reduction Permitted?", it is clearly indicated that live load reduction for helipad live loads is not permitted.

Table 4.3-1. Minimum Uniformly Distributed Live Loads, L_o, and Minimum Concentrated Live Loads.

Occupancy or Use	Uniform, L_o psf (kN/m^2)	Live Load Reduction Permitted? (Section No.)	Multiple-Story Live Load Reduction Permitted? (Section No.)	Concentrated lb (kN)	Also See Section
Apartments (See Residential)					
Access floor systems					
Office use	50 (2.40)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	
Computer use	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	
Armories and drill rooms	150 (7.18)	No (4.7.5)	No (4.7.5)		
Assembly areas					
Fixed seats (fastened to floors)	60 (2.87)	No (4.7.5)	No (4.7.5)		
Lobbies	100 (4.79)	No (4.7.5)	No (4.7.5)		
Movable seats	100 (4.79)	No (4.7.5)	No (4.7.5)		
Platforms (assembly)	100 (4.79)	No (4.7.5)	No (4.7.5)		
Stage floors	150 (7.18)	No (4.7.5)	No (4.7.5)		
Bleachers, folding and telescopic seating, and grandstands	100 (4.79)	No (4.7.5)	No (4.7.5)		4.14
Stadiums and arenas with fixed seats (fastened to the floor)	60 (2.87)	No (4.7.5)	No (4.7.5)		4.14
Other assembly areas	100 (4.79)	No (4.7.5)	No (4.7.5)		
Balconies and decks	1.5 times the live load for the area served. Not required to exceed 100 psf (4.79 kN/m^2)	Yes (4.7.2)	Yes (4.7.2)		
Catwalks for maintenance and service access	40 (1.92)	Yes (4.7.2)	Yes (4.7.2)	300 (1.33)	
Corridors					
First floor	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)		
Other floors	Same as occupancy served except as indicated				
Dining rooms and restaurants	100 (4.79)	No (4.7.5)	No (4.7.5)		
Dwellings (See Residential)					
Elevator machine room and control room grating (on area of 2 in. by 2 in. [50 mm by 50 mm])		—	—	300 (1.33)	
Finish light floor plate construction (on area of 1 in. by 1 in. [25 mm by 25 mm])		—	—	200 (0.89)	
Fire escapes	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)		
On single-family dwellings only	40 (1.92)	Yes (4.7.2)	Yes (4.7.2)		
Fixed ladders		—	—	See Sec. 4.5.4	
Garages and Vehicle Floors					4.10
Passenger vehicle garages	40 (1.92)	No (4.7.4)	Yes (4.7.4)	See Sec. 4.10.1.	
Trucks and bus garages	See Section 4.10.2	—	—	See Sec. 4.10.2.	
Emergency vehicles		—	—	See Sec. 4.10.4	
Handrails and Guard systems	See Section 4.5.1	—	—	See Sec. 4.5.1.	
Grab bars		—	—	See Sec. 4.5.2	
Helipads (See Section 4.11)					
Helicopter takeoff weight 3,000 lb (13.35 kN) or less	40 (1.92)	No (4.11.1)	—	See Sec. 4.11.2.	
Helicopter takeoff weight more than 3,000 lb (13.35 kN)	60 (2.87)	No (4.11.1)	—	See Sec. 4.11.2	
Hospitals					
Operating rooms, laboratories	60 (2.87)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Patient rooms	40 (1.92)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Corridors above first floor	80 (3.83)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Hotels (See Residential)					
Libraries					
Reading rooms	60 (2.87)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Stack rooms	150 (7.18)	No (4.7.3)	Yes (4.7.3)	1,000 (4.45)	4.13
Corridors above first floor	80 (3.83)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	

continues

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction

This proposal with the public comment does not change the technical requirements for helipads and as such there is no effect on the cost of construction.

Final Hearing Results

S85-22	AMPC1

S86-22

Original Proposal

IBC: TABLE 1607.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
3.	Armories and drill rooms		150[a]~~[b]~~	—	—
4.	Assembly areas	Fixed seats (fastened to floor)	60[a]	—	—
		Follow spot, projections and control rooms	50		
		Lobbies	100[a]		
		Movable seats	100[a]		
		Stage floors	150[a]~~[b]~~		
		Platforms (assembly)	100[a]		
		Bleachers, folding and telescopic seating and grandstands	100[a] (See Section 1607.19)		
		Stadiums and arenas with fixed seats (fastened to the floor)	60[a] (See Section 1607.19)		
		Other assembly areas	100[a]		
25.	Recreational uses	Bowling alleys, poolrooms and similar uses	75[a]	—	—
		Dance halls and ballrooms	100[a]		
		Gymnasiums	100[a]		
		Theater projection, control, and follow spot rooms	50		
		Ice skating rinks	250[b]		
		Roller skating rinks	100[a]		

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes changes to the Live Load table to coordinate with ASCE 7.1) The table entry for follow spot rooms, control rooms, and projection rooms in theaters is moved from Item 4 Assembly Areas to Item 25 Recreation Areas. This matches the location in the ASCE 7-22 Live Load table. These rooms are not areas that are typically open to the public or have large crowds gather. These are behind the scenes type areas and as such the entry is better located under Recreation Areas. The entry is also reworded in order to make it clear that the intent of these areas is within theaters. The rewording matches the ASCE 7-22 text.

2)The live load reduction footnote for two entries is changed to match the requirements in ASCE 7. For both "Armories and Drill Rooms" and "Stage Floors", the footnote is changed from Footnote B which allows live load reduction per certain sections, to Footnote A which does not allow live load reduction. Both of these changes coordinate with ASCE 7. The occupancy of these two areas is not similar to the occupancies upon which the live load reduction provisions are based and as such the live load reduction provisions should not apply.

Cost Impact: The code change proposal will increase the cost of construction
For designers that were using live load reduction per the IBC and not ASCE 7, this change could increase the size of structural members and as such the cost of construction. It is noted that in these types of areas floor deflection or vibration can control the design and in those cases the size of members and the cost of construction would be unchanged.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate the Live Load Table 1607.1 with ASCE 7-22. The committee noted that in the 2021 IBC, the live loads are not currently specifically defined for theater projection, control and follow spot rooms. (Vote: 9-3)

Final Hearing Results

S86-22	AS

S87-22

Original Proposal

IBC: TABLE 1607.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS
Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
15.	Garages and vehicle floors	Passenger vehicles onlygarages	40^{c}	See Section 1607.7	—
		Trucks and buses	See Section 1607.8		
		Fire trucks and emergency vehicles	See Section 1607.8		
		Forklifts and movable equipment	See Section 1607.8		

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes changes to the live load table to include uses already contained elsewhere in Chapter 16. These changes also coordinate with the ASCE 7 live load table. The IBC already contains provisions for vehicles and moveable equipment in Section 1607.8. These uses should be included in the live load table along with the passenger vehicle and heavy vehicle loads. There is no basis for only including some aspects of Section 1607.8 in the Live Load table.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal does not change requirements and as such will not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate the Live Load Table 1607.1 with ASCE 7-22 for garages and vehicle floors. (Vote: 11-2)

Final Hearing Results

S87-22	AS

S88-22

Original Proposal

IBC: TABLE 1607.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
26.	Residential	One- and two-family dwellings:		—	Section 1607.22
		Uninhabitable attics without storage	10		
		Uninhabitable attics with storage	20		
		Habitable attics and sleeping areas	30		
		Canopies, including marquees	20		
		All other areas	40		
		Hotels and multifamily dwellings:			
		Private rooms and corridors serving them	40		
		Public rooms[a] ~~and corridors serving them~~	100~~[a]~~		
		<u>Corridors serving public rooms</u>	<u>100</u>		
27.	Roofs	Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	—	Section 1607.15.2
		Roof areas used for assembly purposes	100[a]	—	
		Roof areas used for occupancies other than assembly	Same as occupancy served	—	
		Vegetative and landscaped roofs:		—	
		Roof areas not intended for occupancy	20	—	
		Roof areas used for assembly purposes	100[a]	—	
		Roof areas used for~~other~~ occupancies <u>other than assembly</u>	Same as occupancy served	—	
		Awnings and canopies:		—	
		Fabric construction supported by a skeleton structure	5[a]	—	
		All other construction, except one- and two-family dwellings	20	—	
		Primary roof members exposed to a work floor:			
		Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages	—	2,000	
		All other primary roof members	—	300	
		All roof surfaces subject to maintenance workers	—	300	

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2 or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

<u>7-22</u> <u>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</u>

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes changes to two items in the live load table. In Item 26 for "Hotels and multifamily dwellings", the sub-item "public rooms and corridors serving them" is separated into two sub-items, "public rooms" and "corridors serving public rooms". This is done so that Footnote A, which indicates that live load reduction is not permitted, is only applied to the public room sub-item. The public room is the assembly area, where live load reduction is not to be applied. Corridors, including corridors serving the public, are not assembly areas themselves and live load reduction is intended to be permitted as it is for corridors per Item 8 of the live load table. This change also aligns the IBC with the corresponding portion of the live load table in ASCE 7.

In Item 27, editorial changes are made so that consistent terminology is used. The revised text under "Vegetative and landscaped roofs" matches the phrasing used immediately above. These editorial changes are also consistent with ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent has always been not to allow live load reduction for the public room, however some designers may have be excluding live load reduction for the corridors serving them as well. For those designers the size of structural members could decrease and as such the cost of construction could decrease. Most likely the change has no affect on the cost of construction.

The change to the Roof item of the Live Load table is for clarification and will not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies when one can use Live Load reduction to coordinate with ASCE 7-22. (Vote: 11-2)

Final Hearing Results

S88-22 AS

S89-22

Original Proposal

IBC: TABLE 1607.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0, AND MINIMUM CONCENTRATED LIVE LOADS

Portions of table not shown remain unchanged.

OCCUPANCY OR USE			UNIFORM (psf)	CONCENTRATED (pounds)	ALSO SEE SECTION
24.	Penal institutions	Cell blocks	40	—	—
		Corridors	100		
25.	Public Restrooms		Same as live load for area served but not required to exceed 60 psf	—	—

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,

1 square foot = 0.0929 m^2,

1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,

1 pound per cubic foot = 16 kg/m^3.

a. Live load reduction is not permitted.

b. Live load reduction is only permitted in accordance with Section 1607.12.1.2or Item 1 of Section 1607.12.2.

c. Live load reduction is only permitted in accordance with Section 1607.12.1.3 or Item 2 of Section 1607.12.2.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
A public restroom live load was added to the live load table in ASCE 7-22. This live load was contained in a table in the 7-16 commentary. This change coordinates the IBC live load table with ASCE 7-22.

The following text appears in the commentary to ASCE 7-22. "The public restroom uniform live load in Table 4.3-1 applies to restrooms for publicly accessible spaces. Public restrooms should be designed for the live load associated with the occupancy it serves, with an upper limit of 60 psf. The upper limit recognizes that the fixtures within restrooms limit the space available for a dense grouping of occupants."

Cost Impact: The code change proposal will increase the cost of construction
The impact of this change will vary depending on the live load that designers are currently using for these spaces. It is possible that designers are using a lower live load and therefore the size of structural members and the cost of construction could increase.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22 for the Live Loads for public restrooms. The committee did express concerns for the live load for public restrooms associated with large assembly occupancies. (Vote: 10-3)

Final Hearing Results

S89-22	AS

S92-22

Original Proposal

IBC: 1507.15, 1603.1.2, SECTION 1607, 1607.1, 1607.2, 1607.3, 1607.13, 1607.14.1, 1607.12, 1607.14, 1607.14.2, 1607.14.2.1, 1607.14.2.2, 1607.14.3, 1607.14.4, 1607.14.4.1, 1607.14.4.2, 1607.14.4.3, 1607.14.4.4, 1607.14.4.5, 1808.3, 3111.1, 3111.1.1, 3111.1.2, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1507.15 Vegetative roofs and landscaped roofs. *Vegetative roofs* and landscaped roofs shall comply with the requirements of this chapter, Section ~~1607.14.2.2~~1607.13.2 and the *International Fire Code*.

1603.1.2 Roof live load. The *roof live load* used in the design shall be indicated for roof areas~~(Section 1607.14)~~.

SECTION 1607
LIVE LOADS

1607.1 General. *Live loads* are those loads defined in Chapter 2 of this code.

1607.2 Loads not specified. For occupancies or uses not designated in Section 1607, the *live load* shall be determined in accordance with a method *approved* by the *building official*.

Revise as follows:

1607.3 Uniform live loads. The *live loads* used in the design of buildings and*other structures* shall be the maximum loads expected by the intended use or occupancy but shall not be less than the minimum uniformly distributed *live loads* given in Table 1607.1. *Live loads* acting on a sloping surface shall be assumed to act vertically on the horizontal projection of that surface.

~~1607.13~~1607.3.1 ~~Distribution of floor loads~~.Partial loading of floors. Where uniform floor *live loads* are involved in the design of structural members arranged so as to create continuity, the minimum applied loads shall be the full *dead loads* on all spans in combination with the floor *live loads* on spans selected to produce the greatest*load effect* at each location under consideration. ~~Floor~~Uniform floor *live loads*applied to selected spans are permitted to be reduced in accordance with Section 1607.12 .

~~1607.14.1~~1607.3.2 ~~Distribution of roof loads~~Partial loading of roofs. Where uniform roof *live loads* are reduced to less than 20 psf (0.96 kN/m^2) in accordance with Section ~~1607.14.2.1~~1607.13.1 and are applied to the design of structural members arranged so as to create continuity, the reduced roof *live load* shall be applied to adjacent spans or to alternate spans, whichever produces the most unfavorable *load effect*. ~~See Section 1607.14.2 for reductions in minimum roof*live loads* and Section 7.5 of ASCE 7 for partial snow loading~~.

1607.12 Reduction in uniform live loads. Except for uniform *live loads* at roofs, all other minimum uniformly distributed*live loads*, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.12.1 or 1607.12.2. Uniform *live loads* at roofs are permitted to be reduced in accordance with Section ~~1607.14.2~~1607.13.

~~**1607.14 Roof loads.** The structural supports of roofs and *marquees* shall be designed to resist wind and, where applicable, snow and earthquake *loads*, in addition to the *dead load* of construction and the appropriate *live loads* as prescribed in this section, or as set forth in Table 1607.1. The *live loads* acting on a sloping surface shall be assumed to act vertically on the horizontal projection of that surface~~.

~~1607.14.2~~1607.13 Reduction in uniform roof live loads. The minimum uniformly distributed *live loads* of roofs and *marquees*, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section ~~1607.14.2.1~~1607.13.1.

~~1607.14.2.1~~1607.13.1 Ordinary roofs, awnings and canopies. Ordinary flat, pitched and curved roofs, and *awnings* and canopies other than of fabric construction supported by a skeleton structure, are permitted to be designed for a reduced uniformly distributed *roof live load*, L_r, as specified in the following equations or other controlling combinations of *loads* as specified in Section 1605, whichever produces the greater *load effect*.

In structures such as *greenhouses*, where special scaffolding is used as a work surface for workers and materials during maintenance and repair operations, a lower roof *load* than specified in the following equations shall not be used unless *approved* by the *building official*. Such structures shall be designed for a minimum roof live *load* of 12 psf (0.58 kN/m^2).

$$L_r = L_o R_1 R_2 \qquad \textbf{(Equation 16-10)}$$

where: $12 \leq L_r \leq 20$

For SI: $L_r = L_o R_1 R_2$

where: $0.58 \leq L_r \leq 0.96$

L_o = Unreduced *roof live load* per square foot (m^2) of horizontal projection supported by the member (see Table 1607.1).

L_r = Reduced *roof live load* per square foot (m^2) of horizontal projection supported by the member.

The reduction factors R_1 and R_2 shall be determined as follows:

$$R_1 = 1 \text{ for } A_t \leq 200 \text{ square feet } (18.58 \text{ m}^2) \qquad \textbf{(Equation 16-11)}$$

$$R_1 = 1.2 - 0.001A_t \text{ for } 200 \text{ square feet} < A_t < 600 \text{ square feet} \qquad \textbf{(Equation 16-12)}$$

$$R_1 = 0.6 \text{ for } A_t \geq 600 \text{ square feet } (55.74 \text{ m}^2) \qquad \textbf{(Equation 16-13)}$$

where:

A_t = Tributary area (span length multiplied by effective width) in square feet (m^2) supported by the member, and

$$R_2 = 1 \text{ for } F \leq 4 \qquad \textbf{(Equation 16-14)}$$

$$R_2 = 1.2 - 0.05\,F \text{ for } 4 < F < 12 \qquad \textbf{(Equation 16-15)}$$

$$R_2 = 0.6 \text{ for } F \geq 12 \qquad \textbf{(Equation 16-16)}$$

where:

F = For a sloped roof, the number of inches of rise per foot (for SI: F = 0.12 × slope, with slope expressed as a percentage), or for an arch or dome, the rise-to-span ratio multiplied by 32.

~~1607.14.2.2~~1607.13.2 Occupiable roofs. Areas of roofs that are occupiable, such as *vegetative roofs*, landscaped roofs or for assembly or other similar purposes, and *marquees* are permitted to have their uniformly distributed *live loads* reduced in accordance with Section 1607.12 .

~~1607.14.3~~1607.14 Awnings and canopies. *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 as well as for snow *loads* and wind *loads* as specified in Sections 1608 and 1609.

~~1607.14.4~~1607.15 Photovoltaic panel systems. Roof structures that provide support for *photovoltaic panel systems* shall be designed in accordance with Sections ~~1607.14.4.1~~1607.15.1 through ~~1607.14.4.5~~1607.15.5 , as applicable.

~~1607.14.4.1~~1607.15.1 Roof live load. Roof structures that support *photovoltaic panel systems* shall be designed to resist each of the following conditions:

1. Applicable uniform and concentrated roof *loads* with the *photovoltaic panel system dead loads*.

   Exception: *Roof live loads* need not be applied to the area covered by *photovoltaic panels* where the clear space between the panels and the roof surface is 24 inches (610 mm) or less.

2. Applicable uniform and concentrated roof loads without the *photovoltaic panel system* present.

~~**1607.14.4.2**~~**1607.15.2 Photovoltaic panels or modules.** The structure of a roof that supports solar *photovoltaic panels* or modules shall be designed to accommodate the full solar *photovoltaic panels* or modules and ballast *dead load*, including concentrated *loads* from support frames in combination with the *loads* from Section ~~1607.14.4.1~~1607.15.1 and other applicable *loads*. Where applicable, snow drift *loads* created by the *photovoltaic panels* or modules shall be included.

~~**1607.14.4.3**~~**1607.15.3 Photovoltaic panels installed on open grid roof structures.** Structures with open grid framing and without a *roof deck* or sheathing supporting *photovoltaic panel systems* shall be designed to support the uniform and concentrated *roof live loads* specified in Section ~~1607.14.4.1~~1607.15.1, except that the uniform *roof live load* shall be permitted to be reduced to 12 psf (0.57 kN/m^2).

~~**1607.14.4.4**~~**1607.15.4 Ground-mounted photovoltaic (PV) panel systems or modules installed as an independent structure.** Ground-mounted photovoltaic (PV) panel systems that are independent structures and do not have accessible/occupied space underneath are not required to accommodate a roof photovoltaic *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

~~**1607.14.4.5**~~**1607.15.5 Ballasted photovoltaic panel systems.** Roof structures that provide support for ballasted *photovoltaic panel systems* shall be designed, or analyzed, in accordance with Section 1604.4; checked in accordance with Section 1604.3.6 for deflections; and checked in accordance with Section 1611 for ponding.

1808.3 Design loads. Foundations shall be designed for the most unfavorable effects due to the combinations of *loads* specified in Section 2.3 or 2.4 of ASCE 7 or the alternative allowable stress design load combinations of Section 1605.2. The *dead load* is permitted to include the weight of foundations and overlying fill. Reduced *live loads*, as specified in Sections 1607.12 and ~~1607.14~~1607.13, shall be permitted to be used in the design of foundations.

3111.1 General. Solar energy systems shall comply with the requirements of this section.

3111.1.1 Wind resistance. Rooftop-mounted photovoltaic (PV) panel systems and solar thermal collectors shall be designed in accordance with Section 1609.

Revise as follows:

3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section ~~1607.14.4~~1607.15.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to improve the coordination between the IBC and ASCE 7 by aligning the organization of 1) partial loading requirements and 2) roof live load provisions.

This proposal primarily relocates requirements in Section 1607 Live Loads so that they are provided in a more logical order and so that they align with ASCE 7. General requirements for the distribution of uniform floor live loads and uniform roof live loads, also known as partial loading or pattern loading, are moved forward in Section 1607 so that they appear immediately after the introduction of uniform live loads in Section 1607.3. These requirements are better suited to appear in the beginning of the Live Load section as they are general requirements. The placement as subsections under Section 1607.3 Uniform live loads is logical as they apply to uniform loads. This location also aligns with ASCE 7.

Minor changes to the text are also made in some locations for clarity and to coordinate with the ASCE 7 text.

In Section 1607.3, the sentence added at the end is moved from existing Section 1607.14 Roof Loads as that section is deleted in the proposal (see below for why). This sentence does not just apply to roofs, it also applies to sloped ramps, and therefore it is better suited in Section 1607.3 whose scope is not limited to roofs.

Section 1607.13 is relocated to 1607.3.1 as a sub-section to the Uniform Live Load section. It is also renamed to better describe the content. This section deals with selectively applying the uniform live load, or pattern loading, and therefore is more appropriately located directly after the uniform live load section.

Section 1607.14 Roof Loads is deleted except for one sentence that was moved to Section 1607.3 as described above. There is no need for a stand alone Roof Loads section as roof live loads are contained in Table 1607.1 just like all the other live loads. In addition, most of the text in 1607.14 references other loads, wind, snow, earthquake, and dead, which has no place in the Live Load section. These loads have their own sections in the IBC, and there is also a section (Load Combinations) that governs how to combine the different loads.

Section 1607.14.1 is also relocated as a sub-section to the Uniform Live Load section, as new Section 1607.3.2. This section deals with roof pattern live loading and is more appropriately located after the uniform live load section.

The remainder of the changes are section number changes that are the result of moving the two sections on load distribution, 1607.3 and 1607.14.1, and deleting the Roof Load section, 1607.14. The uniform roof live load reduction provision get their own section, Section 1607.13, awnings and canopies get Section 1607.14, and the photovoltaic panel systems get Section 1607.14.

Due to an issue with cdpAccess not formatting existing Section 1607.14.2.1 correctly, a Word file is attached to this proposal that correctly shows the new section number for this section and shows it in its new location.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal contains ASCE 7 alignment and coordination changes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22. (Vote: 13-0)

Final Hearing Results

S92-22 AS

S94-22

Original Proposal

IBC: 1607.5, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.5 Partition loads. In office buildings and in other buildings where partition locations are subject to change, provisions for partition weight shall be made, whether or not partitions are shown on the construction documents~~, unless the specified *live load* is 80 psf (3.83 kN/m^2) or greater~~. The partition *load* shall be not less than a~~uniformly distributed~~ *live load* of 15 psf (0.72 kN/m^2) and shall not be reduced per Section 1607.12.

Exception: A partition *live load* is not required where the minimum specified *live load* is 80 psf (3.83 kN/m^2~~)~~ or greater.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

These changes are proposed to improve the coordination between the IBC and ASCE 7.

This proposal moves the exception that is embedded within the text and places it at the end of the section in the typical format for exceptions in the IBC. It also removes the words "uniformly distributed" as they are unnecessary. The indicated 15 psf live load is by nature of the units, a uniform load.

This proposal does not change the technical requirements of the section. The proposed clarification regarding live load reduction was added in the 2022 edition of ASCE 7. The following text is part of the reason statement contained in the ASCE 7 proposal:

"On November 7th, 2018, Dr. Ross Corotis and James R Harris met with the Dead and Live Load Subcommittee and confirmed that when partition loads were added to ASCE 7 they were not considered to be reducible. The current ASCE 7 language leaves room for interpretation, therefore the subcommittee felt that further clarification was needed. Dr. Ross Corotis is a co-author for various articles in structural engineering journals that eventually become the live load reduction theory that is currently found in ASCE 7. These articles include “Probability Model for Design Live Loads” and “Area-Dependent Processes for Structural Live Loads” in the Journal of the Structural Division, in October 1980 and May 1981 respectively, which are references in the Live Load Commentary. Neither of those studies provide any basis for reduction of partition loads. In office buildings and in other buildings where partition locations are subject to change, partitions are often moved around without consulting a structural engineer. Since a new tenant might cluster partitions differently than the last tenant, preparing for the worst-case load for the life of the building is recommended. "

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Improving coordination with ASCE 7 is not expected to effect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22 and the proposal clarifies that partition load should not be reduced. (Vote: 14-0)

Final Hearing Results

S94-22	AS

S95-22

Original Proposal

IBC: 1607.6

Proponents: John Grenier, National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Erik Madsen, Madsen Consulting Engineering, PLLC, NCSEA (erik@madsenengineering.com)

2021 International Building Code

Revise as follows:

1607.6 Helipads. Helipads shall be designed for the following *live loads*:

1. A uniform *live load*, *L*, as specified in Items 1.1 and 1.2. This *load* shall not be reduced.
   1.1. 40 psf (1.92 kN/m^2) where the design basis helicopter has a maximum take-off weight of 3,000 pounds (13.35 kN) or less.
   1.2. 60 psf (2.87 kN/m^2) where the design basis helicopter has a maximum take-off weight greater than 3,000 pounds (13.35 kN).
2. A single concentrated *live load*, *L*, of 3,000 pounds (13.35 kN) applied over an area of 4.5 inches by 4.5 inches (114 mm by 114 mm) and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated *load* is not required to act concurrently with other uniform or concentrated *live loads*.
3. Two single concentrated *live loads*, *L*, 8 feet (2438 mm) apart applied on the landing pad (representing the helicopter's two main landing gear, whether skid type or wheeled type), each having a magnitude of 0.75 times the maximum take-off weight of the helicopter, and located so as to produce the maximum *load effects* on the structural elements under consideration. The concentrated loads shall be applied over an area of 8 inches by 8 inches (203 mm by 203 mm) and are not required to act concurrently with other uniform or concentrated *live loads*.

~~Landing areas designed for a design basis helicopter with~~Helipads shall be marked to indicate the maximum take-off weight ~~of 3,000 pounds (13.35 kN) shall be identified with a 3,000-pound (13.34 kN) weight limitation~~. The take-off ~~landing area~~ weight limitation shall be indicated in units of thousands of pounds and placed in a box that is~~by the numeral "3" (kips)~~ located in the bottom right corner of the landing area as viewed from the primary approach path. The ~~indication for the landing area weight limitation~~box shall be a minimum 5 feet (1524 mm) in height.

Reason: To extend the marking requirements to all helipads and not just helipads with a maximum take-off weight of 3,000 pounds.
In review of the current requirements and the commentary it is not clear as to why only helipads with a maximum take-off weight of 3,000 lbs are required to have markings identifying the weight limitations. Helipads for design weights greater than or less than 3,000 lbs should also have the weight limitations identified.

FAA Advisory Circular AC No. 150/5390-2C (2012) provides standards for the design of heliports serving helicopters with single rotors. Sections 215(b), 314(b), and 414(b) of the FAA Advisory Circular contain marking requirements for the touchdown and lift-off (TLOF) area for heliports. The proposed changes to the marking requirements are consistent with the FAA Advisory Circular.

For General Aviation identification symbols (Figure 2-23 AC No. 150/5390-2C) the symbol is a 5ft square "box". The term "box" is used within the Circular and applied to this proposal. Marking requirements within the box are not contained in current IBC language and based on current IBC commentary standard practice.

Bibliography: FAA Advisory Circular AC No. 150/5390-2C
(2012) https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5390-2

Cost Impact: The code change proposal will increase the cost of construction
The cost of construction will be marginally increase by this change. The additional cost for paint making the weight limitation, while most often already in practice, will be required for all helipads.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal improves uniformity in helipad marking. (Vote: 10-3)

Final Hearing Results

S95-22	AS

S97-22

Original Proposal

IBC: 1607.7, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.7 Passenger vehicle garages. Floors in garages ~~or~~and portions of a building used for the storage of motor vehicles shall be designed for the uniformly distributed *live loads* indicated in Table 1607.1 or the following concentrated *load*:

1. For garages restricted to passenger vehicles accommodating not more than nine passengers, 3,000 pounds (13.35 kN) acting on an area of 4.5 inches by 4.5 inches (114 mm by 114 mm).
2. For mechanical parking structures without slab or deck that are used for storing passenger vehicles only, 2,250 pounds (10 kN) per wheel.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal makes a change to coordinate with the 2022 edition of ASCE 7. The proposal replaces "or" with "and" as the intent is to require **both** 1) garage floors and 2) portions of a building floor used for the storage of motor vehicles, to be designed for the indicated live loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Making the text more clear and improving coordination with ASCE 7 is not expected to effect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22 and per the provided reason statement. (Vote: 13-0)

Final Hearing Results

S97-22	AS

S98-22

Original Proposal

IBC: 1607.8, 1607.8.1, 1607.8.2, ASCE/SEI Chapter 35 (New)
Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

1607.8 Heavy vehicle loads. Floors and other surfaces that are intended to support vehicle *loads* greater than a 10,000-pound (4536 kg) gross vehicle weight rating shall comply with Sections 1607.8.1 through 1607.8.5.

1607.8.1 Loads. Where any structure does not restrict access for vehicles that exceed a 10,000-pound (4536 kg) gross vehicle weight rating, those portions of the structure subject to such *loads* shall be designed using the vehicular *live loads*, including consideration of impact and fatigue, in accordance with the codes and specifications required by the jurisdiction having authority for the design and construction of the roadways and bridges in the same location of the structure.

Revise as follows:

1607.8.2 Fire truck and emergency vehicles. Where a structure or portions of a structure are accessed ~~and loaded~~ by fire department ~~access~~ vehicles and other similar emergency vehicles, <u>those portions of</u> the structure <u>subject to such *loads*</u> shall be designed for the greater of the following *loads*:

1. The actual operational *loads*, including outrigger reactions and contact areas of the vehicles as stipulated and *approved* by the *building official*.
2. The live loading specified in Section 1607.8.1.

<u>Emergency vehicle loads need not be assumed to act concurrently with other uniform *live loads*.</u>

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

<u>7-22</u> <u>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</u>

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal revises the text of Section 1607.8.2 to coordinate with ASCE 7. The 2022 edition of ASCE 7 has added live loads due to fire truck and emergency vehicles.

The proposed changes to the first paragraph also coordinate with the text of the preceding section, Section 1607.8.1 by using the phrases "those portions of" and "subject to such loads". The text, "and loaded", is deleted as it is unnecessary with the use of the "subject to such loads". It is noted that the "and loaded" text is also redundant as it is used, if a vehicle accesses a portion of the structure, it will also load that portion of the structure.

The additional text at the end of the section adds clarity for the application of the live loads. The operational loads of fire trucks and emergency vehicles are significant loads and do not need to be combined with other uniform live loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reorganizing text and improving coordination with ASCE 7 is not expected to effect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22. The proposal appropriately addresses emergency vehicle live loads. The committee encouraged consideration of public comment to clarify that the emergency vehicle live loads do not act concurrently with other uniform live loads. (Vote: 13-0)

Final Hearing Results

S98-22	AS

S100-22

Original Proposal

IBC: 1607.9.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.9.1 Handrails and guards. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. Glass *handrail* assemblies and *guards* shall comply with Section 2407.

Exceptions:

1. For one- and two-family dwellings, only the single concentrated *load* required by Section 1607.9.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).
3. For roofs not intended for occupancy, only the single concentrated *load* required by Section 1607.9.1.1 shall be applied.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposals adds an exception to the requirement to design handrails and guards for the 50 plf load to coordinate with ASCE 7. The proposed exception was added to ASCE 7 for the 2022 edition.

Unoccupied rooftops are not factory, industrial, or storage occupancies and therefore do not currently qualify for what is in essence a reduced load; however, unoccupied roofs have, at most, a few maintenance workers on them at intermittent times and arguably pose less of a hazard then rails at one- and two-family dwellings and the other occupancies to which this exception currently applies. Unoccupied rooftop areas meet the two other requirements -- namely that they are areas not accessible to the public and serve an occupant load not greater than 50.

Note, the term "roofs not intended for occupancy" is proposed as it coordinates with the terminology used in the live load table.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal has the possibility of reducing design and construction costs where the new exception applies.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22 and the proposal adds an appropriate exception for roofs not intended for occupancy. (Vote: 13-0)

Final Hearing Results

S100-22 AS

S101-22

Original Proposal

IBC: 1607.9, 1607.9.1.1, 1607.9.1

Proponents: John Grenier, National Council of Structural Engineers Associations (NCSEA) (jgrenier@grenierengineering.com); Erik Madsen, Madsen Consulting Engineering, PLLC, NCSEA (erik@madsenengineering.com); Edwin Huston, Huston Structural Engineering, PLLC, NCSEA (huston@smithhustoninc.com)

2021 International Building Code

1607.9 Loads on handrails, guards, grab bars and seats. *Handrails* and *guards* shall be designed and constructed for the structural loading conditions set forth in Section 1607.9.1. Grab bars, shower seats and accessible benches shall be designed and constructed for the structural loading conditions set forth in Section 1607.9.2.

Revise as follows:

1607.9.1~~.1 Concentrated load~~Handrails and guards. *Handrails* and *guards* shall be designed to resist a concentrated *load* of 200 pounds (0.89 kN) in accordance with Section 4.5.1 of ASCE 7. Glass handrail assemblies and guards shall comply with Section 2407.

1607.9.1.1 ~~Handrails and guards~~ Uniform Load. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. ~~Glass *handrail* assemblies and *guards* shall comply with Section 2407~~. This load need not be assumed to act concurrently with the concentrated load specified in Section 1607.9.1

Exceptions:

1. For one- and two-family dwellings, only the single concentrated *load* required by Section 1607.9.1~~.1~~ shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).

Reason: The purpose for the proposed changes are two fold.
First, the intent is to clarify that the uniform load and concentrated load need not be applied concurrently.While it is contained within the ASCE 7 language that the concentrated and uniform guard loads are not concurrent, there was seen as a need to reinforce this requirement in the language within the IBC.

Second, the text was modified to be consistent with section 4.5.1 of ASCE 7. The order of the loading requirements in IBC is changed to match the order within ASCE 7. The concentrated load will be presented first, with the uniform load, and the limitations on the uniform load, will be moved to the subsection. The technical design requirements are not being changed. The editorial modifications are being proposed to make the two loads more clearly defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed change is editorial and to provide consistency between the IBC and referenced standards.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies that handrail / guard uniform load and concentrated load do not act concurrently. This is consistent with ASCE 7. (Vote: 13-0)

Final Hearing Results

S101-22	AS

S103-22

Original Proposal

IBC: 1607.17, 1607.10, 1607.11, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

~~1607.17~~1607.10 Fixed ladders. Fixed ladders with rungs shall be designed to resist a single concentrated *load* of 300 pounds (1.33 kN) in accordance with Section 4.5.4 of ASCE 7. Where rails of fixed ladders extend above a floor or platform at the top of the ladder, each side rail extension shall be designed to resist a single concentrated *load* of 100 pounds (0.445 kN) in accordance with Section 4.5.4 of ASCE 7. Ship's ladders shall be designed to resist the *stair loads* given in Table 1607.1.

~~1607.10~~1607.11 Vehicle barriers. *Vehicle barriers* for passenger vehicles shall be designed to resist a concentrated*load* of 6,000 pounds (26.70 kN) in accordance with Section 4.5.3 of ASCE 7. Garages accommodating trucks and buses shall be designed in accordance with an *approved* method that contains provisions for traffic railings.

~~1607.11~~1607.12 Impact loads. The *live loads* specified in Sections 1607.3 through ~~1607.10~~1607.11 shall be assumed to include adequate allowance for ordinary impact conditions. Provisions shall be made in the structural design for uses and loads that involve unusual vibration and impact forces.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal moves the Fixed Ladders live load section in order to place it under the umbrella of the live loads considered to include allowance for ordinary impact conditions by the Impact Loads section. This change coordinates with how ASCE 7 treats fixed ladder live loads.

No technical changes are made to the live load values. Subsequent sections will need to be renumbered.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is not likely that designers are increasing fixed ladder loads to account for impact, but if they are, this would decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal coordinates with ASCE 7-22 for impact loads. (Vote: 13-0)

Final Hearing Results

S103-22	AS

S105-22

Original Proposal

IBC: 1607.12.1.2, 1607.12.1.3, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.12.1.2 Heavy live loads. *Live loads* that exceed 100 psf (4.79 kN/m^2) shall not be reduced.

Exceptions:

1. The *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent, but the <u>reduced</u> *live load* shall be not less than *L* as calculated in Section 1607.12.1.
2. For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

1607.12.1.3 Passenger vehicle garages. The *live loads* shall not be reduced in passenger vehicle garages.

Exception: The *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent, but the <u>reduced</u> *live load* ~~be~~ shall be not less than *L* as calculated in Section 1607.12.1.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

<u>7-22</u> <u>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</u>

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
The proposal adds the word "reduced" in front of live load in two places to coordinate the IBC text with the ASCE 7 text. The text should indicate the "reduced live load" as it is the reduced value from these two sections (limited to a maximum 20% reduction) that is required to be compared to "L" in Section 1607.12.1.The proposal also deletes an extraneous "be" in the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial changes for clarity.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal coordinates with ASCE 7-22 and clarifies the exception for reduced live loads. (Vote: 13-0)

Final Hearing Results

S105-22	AS

S106-22

Original Proposal

IBC: 1607.12.2

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.12.2 Alternative uniform live load reduction. As an alternative to Section 1607.12.1 and subject to the limitations of Table 1607.1, uniformly distributed *live loads* are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.

1. For *live loads* not exceeding 100 psf (4.79 kN/m^2), the design *live load* for structural members supporting 150 square feet (13.94 m^2) or more is permitted to be reduced in accordance with Equation 16-8.

   R = 0.08(A - 150)　　　(Equation 16-8)

   For SI: R = 0.861(A - 13.94)

   where:

   A = Area of floor supported by the member, square feet (m^2).

   R = Reduction in percent.

   Such reduction shall not exceed the smallest of:

   1.1 40 percent for members supporting one floor.

   1.2 60 percent for members supporting two or more floors.

   1.3 *R* as determined by the following equation:

   R = 23.1(1 + D/L_o)　　　(Equation 16-9)

   where:

   D = *Dead load* per square foot (m^2) of area supported.

   L_o = Unreduced *live load* per square foot (m^2) of area supported.

2. A reduction shall not be permitted where the *live load* exceeds 100 psf (4.79 kN/m^2) except that the design *live load* for members supporting two or more floors is permitted to be reduced by not greater than 20 percent.

   Exception: For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

3. A reduction shall not be permitted in passenger vehicle parking garages except that the *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent.

4. For one-way slabs, the area, *A*, for use in Equation 16-8 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.

~~1. A reduction shall not be permitted where the *live load* exceeds 100 psf (4.79 kN/m^2) except that the design *live load* for members supporting two or more floors is permitted to be reduced by not greater than 20 percent.~~

   ~~**Exception:** For uses other than storage, where *approved*, additional *live load* reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.~~

~~2. A reduction shall not be permitted in passenger vehicle parking garages except that the *live loads* for members supporting two or more floors are permitted to be reduced by not greater than 20 percent.~~

3. ~~For *live loads* not exceeding 100 psf (4.79 kN/m²), the design *live load* for any structural member supporting 150 square feet (13.94 m²) or more is permitted to be reduced in accordance with Equation 16-8~~

4. ~~For one-way slabs, the area, *A*, for use in Equation 16-8 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.~~

~~R = 0.08(A - 150)~~ **~~(Equation 16-8)~~**

~~For SI: *R* = 0.861(*A* - 13.94)~~

~~Such reduction shall not exceed the smallest of~~:

1. ~~40 percent for members supporting one floor~~.

2. ~~60 percent for members supporting two or more floors~~.

3. ~~*R* as determined by the following equation:~~

~~R = 23.1(1 + D/L_o)~~ **~~(Equation 16-9)~~**

~~where:~~

~~*A* = Area of floor supported by the member, square feet (m²).~~

~~*D* = *Dead load* per square foot (m²) of area supported.~~

~~L_o = Unreduced *live load* per square foot (m²) of area supported.~~

~~*R* = Reduction in percent~~.

Reason: This proposal reorganizes the alternative live load reduction provisions (Section 1607.12.2) into a more logical order that aligns with both the historical format of these provisions and the format of the basic live load reduction provisions (Section 1607.12.1). The current order places the actual live load reduction equation at the end of the section, after the qualifications and limitations. This places the proverbial cart before the horse.
Currently Section 1607.12.2 lists four numbered items, then presents the reduction equation, the equation limitations, and the symbol definitions. This organization has caused confusion as it appears the equation and related information is a part of Item 4.

The reorganization moves Item 3 to Item 1 as Item 1 is the general requirement and it directly references the reduction equation. The reduction equation, its limitations, and the symbol definitions are then incorporated into Item 1. Placing the equation into the first item is more logical and mirrors the layout of the basic live load reduction requirement in Section 1607.12.1. It also aligns with the historical format from ANSI A58.1, *Building Code Requirements for Minimum Design Loads in Buildings and Other Structures*, which listed the rate of live load reduction first, before any limitations.

The other existing items are then simply renumbered and reference back to the previously provided equation as necessary.

This proposal does not change the technical requirements of the section. There is a minor change as the word "any", in front of "structural member", was removed from Item 3 (now Item 1). The word "any" in this case is unnecessary, it also does appear in the corresponding location in Section 1607.12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No technical changes are included in this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal reorganizes the sections for a more logical flow of the alternative uniform live load reduction method. (Vote: 11-2)

Final Hearing Results

S106-22	AS

S109-22

Original Proposal

IBC: 1607.14.2

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1607.14.2 Reduction in uniform roof live loads. The minimum uniformly distributed *live loads* of roofs and *canopies* ~~*marquees*~~, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.14.2.1.

Reason: *Marquees* are defined to be a specific kind of*canopy*, yet the the subsections of this section include all*canopies*. This is simply a clean up of incorrect wording.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Just clarifying wording of a section to line-up with its subsections

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1607.14.2 Reduction in uniform roof live loads. The minimum uniformly distributed *live loads* of roofs, *marquees,* and canopies, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.14.2.1.

Committee Reason: Approved as modified as per the provided reason statement. The modification appropriately keeps marquees consistent with current wording. (Vote: 13-0)

Final Hearing Results

S109-22	AM

S110-22

Original Proposal

IBC: 1607.14.3, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Delete without substitution:

~~**1607.14.3 Awnings and canopies.** *Awnings* and canopies shall be designed for uniform *live loads* as required in Table 1607.1 as well as for snow *loads* and wind *loads* as specified in Sections 1608 and 1609~~.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
These changes are proposed to improve the coordination between the IBC and ASCE 7 by removing unnecessary pointers that do not appear in ASCE 7.

Awning and canopy live loads are listed in the live load table. Section 1607.14.3 is simply a pointer to the live load table and as such is unnecessary. Typically separate section are only provided when additional information regarding the live load is provided. This section does not further clarify the application or applicability of the live load for these items.

The reference to snow and wind loads in the live load section is also unnecessary. These loads are addressed in their own IBC sections. There is nothing in the wind and snow load sections that suggest that awnings and canopies are exempt from these loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change loads in the IBC.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: Approved as submitted as per the provided reason statement and that the pointer in section 1607.14.3 is not required. Some members of the committee felt the pointer in section 1607.14.3 assists with the flow. (Vote: 9-4)

Final Hearing Results

S110-22	AS

S112-22

Original Proposal

IBC: 1607.14.4.3

Proponents: Larry Sherwood, Interstate Renewable Energy Council, Sustainable Energy Action Committee (Larry@irecusa.org); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals

2021 International Building Code

Revise as follows:

1607.14.4.3 ~~Photovoltaic panels installed on~~ Elevated PV support structures with open grid ~~roof structures~~ framing. ~~Structures~~ *Elevated PV support structures* with open grid framing and without a *roof deck* or sheathing ~~supporting *photovoltaic panel systems*~~ shall be designed to support the uniform and concentrated *roof live loads* specified in Section 1607.14.4.1, except that the uniform *roof live load* shall be permitted to be reduced to 12 psf (0.57 kN/m^2).

Reason: This provides alignment with a new definition for these types of structures, which was included in the Group A cycle in accordance with Proposal G193-21. Language that occurs in the newly defined term becomes redundant and can be struck from Section 1607.14.4.3 for clarity.

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal provides clarity, and alignment with the new definition for these types of structures.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted consistent with the actions taken in the Group A CAH and Group B CAH. (Vote:13-1)

Final Hearing Results

S113-22

Original Proposal

IBC: 1607.14.4.4

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

1607.14.4.4 Ground-mounted photovoltaic (PV) panel systems or modules installed as an independent structure. Ground-mounted photovoltaic (PV) panel systems tha~~t are independent structures and do not have accessible/occupied space underneath~~are not required to accommodate a roof ~~photovoltaic~~ *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

Reason:
This is a further improvement on what was revised in Group A through the action on G1-21, Part I. The proposal G1-21, Part I was to address the need to revise “accessible” to “access”.

Note the following definition was created by Proposal G193-21 in Group A**“**.**PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED.** An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.”

This provides alignment with a new definition for these types of structures, which was included in the Group A cycle in accordance with Proposal G193-21.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: G1-21 Part I
Section 1607.14.4.4

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarity, and alignment with the definition of ground mounted PV panel systems and accessible.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1607.14.4.4 Ground-mounted photovoltaic (PV) panel systems installed as an independent structure. Ground-mounted photovoltaic (PV) panel systems ~~that~~ are not required to accommodate a roof *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

Committee Reason: Approved as modified per the provided reason statement. The modification fixes the grammar. (Vote: 14-0)

Final Hearing Results

S113-22	AM

S114-22

Original Proposal

IBC: 1607.15, 1607.15.1, 1607.15.2, 1607.15.3, 1607.15.4, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

1607.15 Crane loads. The crane *live load* shall be the rated capacity of the crane. Design*loads* for the runway beams, including connections and support brackets, of moving bridge cranes and monorail cranes shall be in accordance with Section 4.9 of ASCE 7.~~include the maximum wheel *loads* of the crane and the vertical impact, lateral and longitudinal forces induced by the moving crane~~.

Delete without substitution:

~~**1607.15.1 Maximum wheel load.** The maximum wheel *loads* shall be the wheel*loads* produced by the weight of the bridge, as applicable, plus the sum of the rated capacity and the weight of the trolley with the trolley positioned on its runway at the location where the resulting *load effect* is maximum.~~

~~**1607.15.2 Vertical impact force.** The maximum wheel *loads* of the crane shall be increased by the following percentages to account for the effects of vertical impact or vibration:~~

Monorail cranes (powered)	25 percent
Cab-operated or remotely operated bridge cranes (powered)	25 percent
Pendant-operated bridge cranes (powered)	10 percent
Bridge cranes or monorail cranes with hand-geared bridge, trolley and hoist	0 percent

~~**1607.15.3 Lateral force.** The lateral force on crane runway beams with electrically powered trolleys shall be calculated as 20 percent of the sum of the rated capacity of the crane and the weight of the hoist and trolley. The lateral force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction perpendicular to the beam, and shall be distributed with due regard to the lateral stiffness of the runway beam and supporting structure.~~

~~**1607.15.4 Longitudinal force.** The longitudinal force on crane runway beams, except for bridge cranes with hand-geared bridges, shall be calculated as 10 percent of the maximum wheel *loads* of the crane. The longitudinal force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction parallel to the beam.~~

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal is the first of two proposals from ASCE 7 regarding crane live loads. Both proposals are intended to keep the IBC coordinated with ASCE 7, but each proposal accomplishes that coordination in different ways.The 2022 edition of ASCE 7 includes revisions to the Vertical Impact Force provisions for the crane wheel loads. These changes were made to align the vertical impact factor with crane service class for consistency with crane industry practice and with the CMAA (Crane Manufacturers Association of America) document referenced by the ASCE 7 commentary. The revisions consist of changes to the Vertical Impact Factor table and the inclusion of crane service class descriptions adapted from the CMAA document.

In order to keep the IBC coordinated with ASCE 7-22, as well as crane industry practice, changes are also needed to the IBC. However, the changes to ASCE 7 included the addition of a significant amount of text. As an alternative to also placing this text in the IBC, this proposal accomplishes the IBC-ASCE 7 coordination by having the IBC simply reference ASCE 7 for the majority of the crane load information. The base requirement that the crane live load is to be the rated capacity of the crane remains stated in the IBC. The information detailing the design loads for the runway beams is removed and replaced with the reference to ASCE 7.

The information removed from the IBC is structural design information used by the design professional. The information applies to a very limited use, that for runway beams supporting moving bridge cranes and monorail cranes. The reference to ASCE 7 for this design information is similar to material design information that is contained in referenced design standards and not within the IBC itself, such as in ACI 318 for concrete and AISC 360 for steel.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Relocating the crane load information from the IBC to ASCE 7 is not expected to affect the cost of construction. The revisions in ASCE 7 to categorize the crane wheel load impact factor based on the crane service class is also not expect to affect the cost of construction as the use of the crane service class is recognized in the crane industry.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted the provide consistency with ASCE 7-22. (Vote: 12-1)

Final Hearing Results

S114-22	AS

S116-22

Original Proposal

IBC: CHAPTER 1, SECTION 108, [A] 108.1, CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 16, SECTION 1608, 1608.1, SECTION 1609, 1609.1.1, SECTION 1612, 1612.2, SECTION 1613, 1613.1, SECTION 1614, 1614.1, SECTION 1615, 1615.1, CHAPTER 31, SECTION 3103, 3103.1, 3103.1.1 (New), 3103.1.1, 3103.1.2, 3103.5 (New), 3103.5.1 (New), TABLE 3103.5.1 (New), 3103.5.1.1 (New), 3103.5.1.2 (New), 3103.5.1.3 (New), 3103.5.1.4 (New), 3103.5.1.5 (New), 3103.5.1.6 (New), 3103.5.1.7 (New), 3103.5.1.8 (New), 3103.5.2 (New), TABLE 3103.5.2 (New), 3103.5.3 (New), 3103.5.4 (New), 3103.5.5 (New), 3103.6 (New), 3103.7 (New), 3103.7.1 (New), 3103.7.2 (New), 3103.7.3 (New), CHAPTER 35, ANSI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Don Scott, ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com); John Grenier, National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Ali Fattah, City of San Diego Development Services Department, City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

CHAPTER 1 SCOPE AND ADMINISTRATION

SECTION 108
TEMPORARY STRUCTURES AND USES

Revise as follows:

[A] 108.1 General. The *building official* is authorized to issue a *permit* for temporary structures and temporary uses. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause. Structures designed to comply with Section 3103.5 shall not be in service for a period of more than 1-year unless an extension of time is granted.

CHAPTER 2 DEFINITIONS

SECTION 202
DEFINITIONS

Add new definition as follows:

PUBLIC-OCCUPANCY TEMPORARY STRUCTURE. Any building or structure erected for a period of one year or less *that support public or private assemblies*, or that provide human shelter, protection, or safety. Public-occupancy temporary structures within the confines of another existing structure (such as convention booths) are exempted from Section 3103.5.

SERVICE LIFE. The period of time that a structure serves its intended purpose. For temporary structures, this shall be the cumulative time of service for sequential temporary events which may occur in multiple locations. For *public-occupancy temporary structures* this is assumed to be a minimum of 10 years.

TEMPORARY EVENT.
A single use during the service life of a *public-occupancy temporary structure* at a given location which includes its installation, inspection, use and occupancy, and dismantling.

TEMPORARY STRUCTURE. Any building or structure erected for a period of 180 days or less to support *temporary events. Temporary* structures include a range of structure types (*public-occupancy temporary structures*, temporary *special event structures*, tents, umbrella and other membrane structures, *relocatable buildings, temporary bleachers, etc.)* for a range of purposes (storage, equipment protection, dining, workspace, assembly, etc.).

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1608 SNOW LOADS

Revise as follows:

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof *load* shall be not less than that determined by Section 1607.

Exception: *Temporary structures* complying with Section 3103.5.1.3.

SECTION 1609 WIND LOADS

Revise as follows:

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.
7. *Temporary structures* complying with Section 3103.5.1.4.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic design wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

SECTION 1612 FLOOD LOADS

Revise as follows:

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24.

Exception: *Temporary structures* complying with Section 3103.5.1.5.

SECTION 1613

EARTHQUAKE LOADS

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.
6. *Temporary structures* complying with Section 3103.5.1.6.

SECTION 1614
ATMOSPHERIC ICE LOADS

Revise as follows:

1614.1 General. *Ice-sensitive structures* shall be designed for atmospheric ice *loads* in accordance with Chapter 10 of ASCE 7. *Public-occupancy temporary structures* shall comply with Section 3103.7.3.

Exception: *Temporary structures* complying with Section 3103.5.1.7.

SECTION 1615
TSUNAMI LOADS

Revise as follows:

1615.1 General. The design and construction of *Risk Category* III and IV buildings and structures located in the *Tsunami Design Zones* defined in the *Tsunami Design Geodatabase* shall be in accordance with Chapter 6 of ASCE 7, except as modified by this code.

Exception: *Temporary structures* complying with Section 3103.5.1.8.

CHAPTER 31 SPECIAL CONSTRUCTION

SECTION 3103
TEMPORARY STRUCTURES

Revise as follows:

3103.1 General. The provisions of Sections 3103.1 through ~~3103.4~~ 3103.7 shall apply to structures erected for a period of less than 180 days. Temporary *special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code* . ~~Those~~ *Temporary structures* erected for a longer period of timeand *public-occupancy temporary structures* shall comply with applicable sections of this code.

Exception: *Public-occupancy temporary structures* complying with Section 3103.1.1 shall be permitted to remain in service for 180 days or more but not more than 1 year when approved by the *Building Official*.

Add new text as follows:

3103.1.1 Extended period of service time. *Public-occupancy temporary structures* shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures when extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and when the following conditions are satisfied:

1. Additional inspections as determined by the *Building Official* shall be performed to verify that site conditions and the approved installation comply with the conditions of approval at the time of final inspection.
2. The *Building Official* shall perform follow up inspections after initial occupancy at intervals not exceeding 180 days to verify the site conditions and the installation conform to the approved site conditions and installation requirements.
3. An examination shall be performed by a registered design professional to determine the adequacy of the*temporary structure* to resist the structural loads required in Section 3103.5.
4. Relocation of the *temporary structures* shall require a new approval by the *Building Official*.
5. The use or occupancy approved at the time of final inspection shall remain unchanged.

Revise as follows:

~~**3103.1.1**~~ **3103.1.2 Conformance.** Temporary structures and uses shall conform to the structural strength, fire safety,*means of egress*, accessibility, light, *ventilation* and sanitary requirements of this code as necessary to ensure public health, safety and general welfare.

~~**3103.1.2**~~ **3103.1.3 Permit required.** Temporary structures that cover an area greater than 120 square feet (11.16 m^2), including connecting areas or spaces with a common *means of egress* or entrance that are used or intended to be used for the gathering together of 10 or more persons, shall not be erected, operated or maintained for any purpose without obtaining a *permit* from the *building official*.

Add new text as follows:

3103.5 Structural requirements. *Temporary structures* shall comply with Chapter 16 of this code. *Public-occupancy temporary structures* shall be designed and erected to comply with requirements of this Section.

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.

TABLE 3103.5.1 REDUCTION FACTORS FOR GROUND SNOW LOADS FOR PUBLIC-OCCUPANCY TEMPORARY STRUCTURES

	Service Life	
Risk Category	≤ 10 yr	>10 yr
II	0.7	1.0
III	0.8	1.0
IV	1.0	1.0

3103.5.1.1 Dead. Dead loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1606.

3103.5.1.2 Live. Live loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1607.

> **Exception**: Where *approved, live loads* less than those prescribed by Table 1607.1 *Minimum Uniformly Distributed Live Loads, L_0, and Minimum Concentrated Live Loads* shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

3103.5.1.3 Snow. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608 and Chapter 7 of ASCE 7. The ground snow loads, p_g, in Section 1608 shall be modified according to Table 3103.5.1.
If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the public-occupancy *temporary structure* is in service shifts to include winter months.

> **Exception:** Risk Category II *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.

3103.5.1.4 Wind. Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609 and Chapters 26 to 30 of ASCE 7. The design wind load shall be modified according to Table 3103.5.2.

Exceptions

1. *Public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.2.
2. *Public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season,the design wind speed shall be set at the following 3-second gust basic *wind speeds* depending on *Risk Category*:
   2.1. For *Risk Category* II use 115 mph,
   2.2. For Risk Category III use 120 mph, and
   2.3. For Risk Category IV use 125 mph.

3103.5.1.5 Flood. An Emergency Action Plan, in accordance with 3103.5.4, shall be submitted for *public-occupancy temporary structures* in a Flood Hazard Area when requested by the Building or Fire Official. *Public-occupancy temporary structures* need not be designed for flood loads specified in Section 1615 except when specifically designed as a dry floodproofed structure or designated to be occupied during a storm event per the approved Emergency Action Plan.

3103.5.1.6 Seismic. Seismic loads on *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic loads are permitted to be taken as 75% of those determined by Section 1613. *Public-occupancy temporary structures* assigned to Seismic Design Categories A and B need not be designed for seismic loads.

3103.5.1.7 Ice. Ice loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1614, Chapter 10 of ASCE 7, with the largest maximum nominal thickness being 0.5 in, for all Risk Categories**.** When ice is expected during the occupancy of *public-occupancy temporary structures*, ice loads shall be determined for surfaces on which ice could accumulate in accordance with ASCE 7. If the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during winter months when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include winter months.

3103.5.1.8 Tsunami. An Emergency Action Plan, in accordance with 3103.5.4, shall be submitted for *public-occupancy temporary structures* in a Tsunami Design Zone when requested by the Building or Fire Official. The *public-occupancy temporary structure* need not be designed for tsunami loads specified in Section 1615.

3103.5.2 Foundations. *Public-occupancy temporary structures* may be supported on the ground with temporary foundations when approved by the Building Official. Consideration shall be given for the impacts of differential settlement when foundations do not extend below the ground or foundations supported on compressible materials. The presumptive load-bearing value for *public-occupancy temporary structures* supported on a pavement, slab on grade or on other *Collapsible or Controlled Low Strength* substrates soils such as beach sand or grass shall be assumed not to exceed 1,000 psf unless determined through testing and evaluation by a registered design professional. The presumptive load-bearing values listed in Table 1806.2 shall be permitted to be used for other supporting soil conditions.

TABLE 3103.5.2 REDUCTION FACTORS FOR WIND LOADS FOR PUBLIC-OCCUPANCY TEMPORARY STRUCTURES

	Service Life	
Risk Category	≤ 10 yr	>10 yr
II	0.8	1.0
III	0.9	1.0
IV	1.0	1.0

3103.5.3 Installation and maintenance inspections. A qualified person shall inspect *public-occupancy temporary structures* that are assembled using transportable and reusable materials; components shall be inspected when purchased or acquired and at least once per year. The inspection shall evaluate individual components, and the fully assembled structure, to determine suitability for use based on the requirements in ESTA ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *Building Official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service.

3103.5.4 Emergency Action plans. When required by the *Building Official*, Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating, securing, or dismantling *public-occupancy temporary structures,* in whole or in part, and removal to prevent damage to surrounding buildings or structures.

3103.5.5 Durability and maintenance. Reusable components used in the erection and the installation of *public-occupancy temporary structures* shall be manufactured of durable materials necessary to withstand environmental conditions at the service location. Components damaged during transportation or installation and due to the effects of weathering shall be replaced or repaired.
A qualified person shall inspect *public-occupancy temporary structures*, including components, when purchased or acquired and at least once per year, based on the requirements in ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *building official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service to ensure that the structure continues to perform as designed and initially erected.

3103.6 Serviceability. The effects of structural loads or conditions shall not adversely affect the serviceability or performance of the *public-occupancy temporary structure*.

3103.7 Controlled occupancy. *Public-occupancy temporary structures* that comply with Section 3103.5 for structural requirements do not require monitoring for controlled occupancy. *Public-occupancy temporary structures* that employ exceptions for reduced environmental loads shall employ controlled occupancy procedures as specified in this section and in accordance with ANSI ES1.7. An operations management plan conforming to ANSI E1.21 with an occupant evacuation plan shall be submitted to the *Building Official* for approval as a part of the permit documents.

3103.7.1 Wind. Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the *public-occupancy temporary structure. T*he *public-occupancy temporary structure* shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.

3103.7.2 Snow. Surfaces on which snow accumulates shall be monitored before and during occupancy of the *public-occupancy temporary structure* and any loads in excess of the design snow load shall be removed prior to its occupancy, or the *public-occupancy temporary structure* shall be vacated in the event that the design snow load is exceeded during its occupancy.

3103.7.3 Ice. Surfaces on which ice accumulates shall be monitored before and during occupancy of the*public-occupancy temporary structure* and any loads in excess of the design ice load*shall* be removed prior to its occupancy, or the *public-occupancy temporary structure* shall be vacated in the event that the design ice load is exceeded during its occupancy.

CHAPTER 35 REFERENCED STANDARDS

Add new standard(s) as follows:

ANSI

American National Standards Institute
25 West 43rd Street, Fourth Floo
New York, NY 10036

E1.21-2013	Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Event
ES1.7-2021	Event Safety Requirements - Weather Preparednes

Reason: There is a need for code provisions for minimum structural loads for temporary structures. In past code cycles, inappropriate references were attempted to be introduced to the International Building Code but failed due to lack of consensus within the industry. Following that failed attempt, committee members from the adopted structural loading standard ASCE/SEI 7 *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* committed to work with building officials and industry stakeholders to develop provisions that align with the design basis for Chapter 16 and ASCE/SEI 7, as well as provide the appropriate level of risk and structural reliability to the public.

To meet the need for minimum loading provisions and deliver on their commitment, this code change proposal was developed by a diverse group of experts that have experience with the development of the ASCE/SEI 7 Standard, building officials from many jurisdictions from across the country that have experience with large events and temporary structures, and industry representatives from the US entertainment industry.

This proposal was developed by an ad hoc committee that met every month since mid-2020 and the included the following members:

- Don Scott; PCS Structural Solutions – ASCE 7 Wind Load Subcommittee
- Jennifer Goupil; ASCE/SEI Codes & Standards - ASCE 7 Main Committee
- Therese McAllister, PhD; NIST – ASCE 7 Load Combinations Subcommittee
- John Hooper; MKA – ASCE 7 Seismic Subcommittee
- John Duntemann; WJE – ASCE 7 Snow Subcommittee
- Andrew Stam; WJE – ASCE 7 Dead & Live Load Subcommittee
- Bryan Lanier; American Tower Corporation – ASCE 7 Ice Load Subcommittee
- Chris Cerino; STV – ASCE 7 Flood Load Subcommittee
- James (Greg) Soules, PhD; CBI – ASCE 7 Main Committee
- Ali Fattah; City of San Diego
- Constadino (Gus) Sirakis; City of New York

This proposal was developed in collaboration with industry stakeholders, many of whom reviewed the proposal and provided comments to the ad hoc committee; the following stakeholders were invited to collaborate, and many provided comments and input for this proposal:

- Richard Nix; Entertainment Services and Technology Assoc. (ESTA)
- Mike Nugent; ICC BCAC Chair
- Steve Kerr; National Council of Structural Engineers Associations (NCSEA)
- Kai Ki Mow; Seattle Department of Construction and Inspection
- Julius Carreon; City of Bellevue Washington

- Paul Armstrong; PCA Code Services
- Daniel Clark; Clark Reder Engineers
- William Gorlin; McLaren Engineers
- David Renn; City of Denver
- Jon Siu; Jon Siu Consulting
- Gary Ehrlich; National Association of Home Builders and ICC/PTF
- Edgar Surla; Southern Nevada Chapter of ICC

Due to the staggered nature of the ICC and ASCE 7 Standard code development processes, this IBC proposal is the first of two efforts to address the need for provisions for loads on temporary structures. The second effort includes development of a new Appendix to ASCE 7 to address temporary structures.

Following is the description and rationale for content of this code change proposal:

The International Codes regulate the construction of new buildings and temporary structures through the International Building Code (IBC) and regulate existing buildings through the International Existing Building Code (IEBC). A temporary structure is not an existing building because it is not permanent and is therefore regulated through Chapter 31 of the IBC.

Temporary Special Event Structures are regulated by the International Fire Code. However, they are a type of temporary structure and thus need to also meet the requirements of this proposed section.

Three new definitions are added for public-occupancy temporary structures, service life, and temporary event. Public-occupancy temporary structures are new buildings or structures that are used by the general public, or that support public events, where the public expects similar levels of reliability and safety as offered by permanent construction. Public-occupancy temporary structures are often assembled with re-useable components and designed for a particular purpose and defined period of time, which is defined as a temporary event when the period of time is less than one year. Public-occupancy temporary structures in service for a period that exceeds 1-year are required to comply with the IBC for new buildings. Temporary structures should not pose more risk to occupants than permanent structures, but because the code's design-level environmental loads are far less likely during a temporary event, this proposal makes adjustments to reduce the requirements for a consistent level of risk. The code change addresses the hazards in the built environment in IBC chapter 16 for public-occupancy temporary structures. The code change includes the ability to mitigate some hazards through Emergency Action Plans. Portions of temporary structures may be removed to reduce wind loads, for example.

The concept of controlled occupancy is also introduced to address cases where an environmental loading hazard cannot be reasonably mitigated and allows for actions based on a preapproved action plan that the Building Official may use to allow installations that cannot resist code prescribed loads. For example, hazard areas such as flood hazard areas and tsunami inundation zones are clearly mapped, and evacuation plans are adopted and include tsunami alert warning systems and temporary structures subject to high wind loads may be evacuated and have sections removed to reduce the wind load. The code change proposal recognizes that it may be desirable for a temporary structure to remain in service for more than 180 days, whether continuously occupied or not, and provides a process that the Building Official can follow to facilitate such an extended service period. However, after 1-year has passed, the structure is required to comply with requirements for new buildings or is removed from service by being disassembled.

DESIGN PHILOSOPHY:

Temporary structures that are occupied by the general public or that could cause injuries or loss of life by their failure require a design basis that is consistent with the risk and reliability criteria in ASCE 7. The basis of design for temporary structures needs to consider voluntary vs involuntary risk, service life, and reliability as well as the ability to reduce risk for the general public for severe weather events, as elaborated below. Therefore, temporary structures occupied by the general public are expected to have the same level of reliability (or failure rate) and performance as permanent structures.

While temporary structures are developed for use up to 180 days, many of these structures are used repeatedly at different locations. Thus, their actual service life may be on the order of 5 to 10 years. Such structures are consequently subjected to repeated assembly and dismantling with associated wear and tear. Therefore, service life for temporary structures is defined to provide a consistent basis of reliability relative to that of new buildings, and a service life of 10 years is assumed for determining structural load requirements in Section 3103.5.

Risk:

In a general sense, risk represents the potential consequences of exposure to a natural or man-made hazard in the presence of uncertainty. There are three components to risk – hazard, consequences and context – and risk-informed decisions should involve all three. The focus in structural engineering has been on the hazard (and its probability of exceedance) and structural performance in terms of failure given a hazard intensity over a structure's service life. Consequences and context are reflected indirectly through Risk Categories (or Importance Factors).

The concept of voluntary and involuntary risk assumed by the general public should be considered in the design of structures. Voluntary risk assumption occurs when people choose to undertake an activity with a known level of hazard and consequences, such as driving or flying to a destination. Involuntary risks occur when people are exposed to a hazard without understanding the potential consequences. The willingness of people to incur risk depends on whether the risk is incurred voluntarily or involuntarily (Slovic, 2000). Because people require shelter, building occupancy is an involuntary risk. The general public assumes that all structures, permanent and temporary, have been designed and constructed to provide the same level of structural safety and reliability. If a structure is designed to a lower level of safety or reliability, the general public has no means to identify or assess the difference in risk. This includes temporary structures that may not be accessible to the general public but could cause injuries or loss of life in the event of failure (e.g., special event structures such as towers, platforms, and stages). Analogies can be made to various modes of transportation, and their inherent risks; the general public is aware of differences in assumed risk and can choose a mode of transportation accordingly. In contrast, ASCE 37 was developed for temporary structures used in construction. The risk associated with these structures is generally limited to construction workers, who voluntarily accept a higher-risk environment and have training and skills for operating in a construction environment. Therefore, temporary structures that are used by or in close proximity to the general public need to have a level of reliability consistent with the other structures designed for involuntary risk.

Reliability:

Structural reliability requires the combined analysis of the probability of occurrence of the hazard and the probability that the loads caused by the hazard equal or exceed the structural resistance. Temporary structures that are used, occupied, or placed in close proximity to the general public should meet reliability targets that are consistent with those for permanent structures in ASCE, allowing for differences in service lives and other conditions of use.

ASCE 7 Table 1.3-1 presents the target reliabilities by Risk Category (RC) and failure mode (e.g., ductile vs brittle failures) for hazards other than earthquake, tsunami, or extraordinary events. The target reliabilities are presented in two formats: the mean annual failure rate and the probability of failure for a 50-yr service life, expressed in terms of reliability index, β. For example, a RC II structure with ductile, local failure modes has a target mean annual failure rate $P_F = 3.0 \times 10^{-5}$ and a 50-yr target reliability index of $\beta = 3.0$ (or $P_F = 1.43 \times 10^{-3}$ over 50 years).

<u>WIND:</u>

ASCE 7-16 wind hazard maps were updated to confirm the risk-based mean recurrence interval (MRI) for RC I to III and to establish a risk-based MRI for RC IV (McAllister, Wang, and Ellingwood 2018). The updated wind maps are based on a fully coupled reliability analysis that considered the hazard and structural resistance. The results for the recommended MRI for the target reliabilities are shown in Figure 3105.5.2.

Two exceptions are allowed for wind:

- An exception is allowed where controlled occupancy actions in Section 3103.7 are adopted, given that on-site management and weather forecasting capabilities allow sufficient time to reduce the risk to occupants by canceling events or reducing the wind loads through removal of wind surface area or dismantling sections of the temporary structure.
- An exception is allowed when public-occupancy temporary structures are erected in a hurricane-prone region outside of hurricane

season. The wind load reduction is based on hurricane and non-hurricane wind speeds. ASCE 7 publishes wind speed maps that include both hurricane and non-hurricane winds for permanent structures. Pintar et al (2015) published maps of non-hurricane non-tornadic wind speeds for the contiguous United States.

A study by Dasguputa and Ghosh (2019) evaluated a wind speed factor of 0.78 used by the Unified Facilities Criteria for temporary structures for 5-yr and 25-yr service lives. This study selected the 50-yr target reliabilities and associated 50-yr wind speed exceedance probabilities to evaluate the wind speed load factor for occupied temporary structures based on ASCE 7-16 wind speed maps. The ASCE 7-16 wind maps for RC I, II, III and IV structures were developed for 15%, 7%, 3% and 1.6% probabilities of wind speed exceedance. To evaluate the 0.78 wind speed factor, wind speeds at 342 locations across the country were identified for specified mean recurrence intervals (MRI). The specified MRI were determined by computing the MRI that would provide the same probability of wind speed exceedance in 5 years and 25 years as that specified for a 50-yr service life in ASCE 7, as shown in Table C3105.1.1. However, the mean recurrence rates of wind speeds, and therefore the structural reliability, are quite different from the ASCE 7 target reliabilities, as shown in Example 1. Assuming that the structural resistance is similar, a comparison of the RC II mean annual frequency for wind speeds for a 50-yr service life (1.43×10^{-3}) to that of a 5-yr service life (1.43×10^{-2}) and a10-yr service life (7.14×10^{-2}) show service life reliability ratios of 10 and 5, respectively, which do not meet the ASCE 7 target reliability criteria.

Until further analyses can be conducted, a 10-yr service life and a wind speed factor of 0.9 is deemed to provide a reasonable level of reliability, given the ability to evacuate or modify temporary structures for strong wind events.

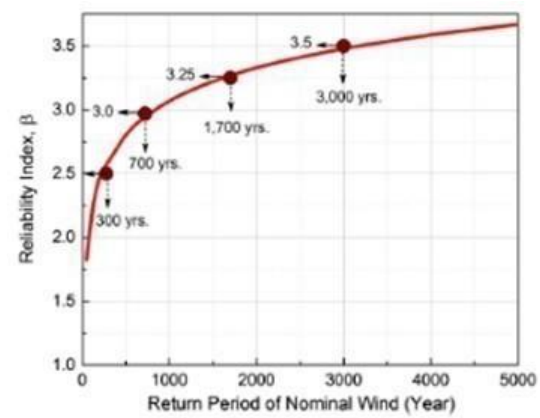

Fig. 3. Recommended mean return periods for wind maps in ASCE 7-16 ($K_{dn} = 0.85$; $\mu_{Kd} = 0.71$)

Figure C3105.5.1. ASCE 7 wind MRI versus reliability index (McAllister, Wang, and Ellingwood 2018).

Table C3105.5.1. Proposed wind speed factor for 5-yr and 25-yr service life for temporary structures by Dasguputa and Ghosh (2019) based on 50-yr service reliability criteria.

ASCE 7 MRIWind speed factor5 yr MRI25 yr MRII3000.7830150II7000.7870350III1,7000.78170850IV3,0000.783001,500

Example 1: Probability of exceedance over T yr service life for W

This example provides a comparison of probability of wind speed exceedance for service lives (T) from 5 to 25 years and Risk Category. The probability of wind exceedance is set to remain constant for each risk category; however, the mean annual frequency (P_a) can vary significantly between different values of T.

$P(W > w \text{ for } T) = 1\text{-}(1\text{-}P_a)^T = X\%$

- W - random wind speed (3-sec gust)
- w - wind speed (3-sec gust) for Mean Recurrence Interval (MRI)
- T is the service life (yr)
- P_a = 1/T is the mean annual frequency for this wind speed (1/yr)
- X is the probability of the wind speed exceedance for T

For a 50 yr service life (ASCE 7):

RC I P(W > 300 MRI in 50 yrs) = $1 - (1 - 0.0033^5)^0 = 0.15$ = 15% $P_a = 3.3\text{x}10^{-3}$

RC II P(W > 700 MRI in 50 yrs) = $1 – (1 - 0.00143^5)^0 = 0.069$ = 7% $P_a = 1.4\text{x}10^{-3}$

RC III P(W > 1700 MRI in 50 yrs) = $1 – (1 - 0.00059^5)^0 = 0.029$ = 3% $P_a = 5.9\text{x}10^{-4}$

RC IV P(W > 3000 MRI in 50 yrs) = $1 – (1 - 0.00033^5)^0 = 0.017$ = 1.7% $P_a = 3.3\text{x}10^{-4}$

For a 25 yr service life:

RC I P(W > 150 MRI in 25 yrs) = $1 - (1 - 0.0067^2)^5 = 0.15$ = 15% $P_a = 6.7\text{x}10^{-3}$

RC II P(W > 350 MRI in 25 yrs) = $1 - (1 - 0.0029^2)^5 = 0.069$ = 7% $P_a = 2.9\text{x}10^{-3}$

RC III P(W > 850 MRI in 25 yrs) = $1 - (1 - 0.0012^2)^5 = 0.029$ = 3% $P_a = 1.2\text{x}10^{-3}$

RC IV P(W > 1500 MRI in 25 yrs) = $1 - (1 - 0.0007)^{25} = 0.017$ = 1.7% $P_a = 6.7\text{x}10^{-4}$

For a 10 yr service life:

RC I P(W > 60 MRI in 10 yrs) = $1 – (1 - 0.017^1)^0 = 0.16$ = 16% $P_a = 1.7\text{x}10^{-2}$

RC II P(W > 140 MRI in 10 yrs) = $1 - (1 - 0.0714^1)^0 = 0.069$ = 7% $P_a = 7.1\text{x}10^{-3}$

RC III P(W > 340 MRI in 10 yrs) = $1 – (1 - 0.00294^1)^0 = 0.029$ = 3% $P_a = 2.9\text{x}10^{-3}$

RC IV P(W > 600 MRI in 10 yrs) = $1 – (1 - 0.00167^1)^0 = 0.017$ = 1.7% $P_a = 1.7\text{x}10^{-3}$

For a 5 yr service life:

RC I P(W > 30 MRI in 5 yrs) = $1 – (1 - 0.0333^5) = 0.16$ = 16% $P_a = 3.3\text{x}10^{-2}$

RC II P(W > 70 MRI in 5 yrs) = $1 – (1 - 0.0143^5) = 0.069$ = 7% $P_a = 1.4\text{x}10^{-2}$

RC III P(W > 170 MRI in 5 yrs) = $1 – (1 - 0.0059^5) = 0.029$ = 3% $P_a = 5.9\text{x}10^{-3}$

RC IV P(W > 300 MRI in 5 yrs) = $1 – (1 - 0.0033)^5 = 0.017$ = 1.7% $P_a = 3.3\text{x}10^{-3}$

References

Dasguputa, P. and S.K. Ghosh (2019)*An Evaluation of the Wind and Seismic Provisions of UFC 1-201-01 for Temporary Structures*, S.K. Ghosh Associates LLC, www.skghoshassociates.com

McAllister, T., N. Wang, and B. R. Ellingwood. 2018.*Risk-informed mean recurrence intervals for update wind maps in ASCE 7-16*, J. Struct. Eng. 144 (5). https://doi.org/10.1061/(ASCE)ST.1943-541X.0002011

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Recurrence Intervals for the Contiguous United States Using a Two-dimensional Poisson Process Extreme Value Model and Local Regression, NIST Special Publication 500-301, National Institute of Standards and Technology, Gaithersburg, MD
https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.500-301.pdf

Slovic, P. (2000), *The perception of risk*. Earthscan Publications, Sterling, VA.
https://www.researchgate.net/publication/232546133_The_perception_of_risk_Risk_society_and_policy_series

SEISMIC:

The requirement that the seismic loads on temporary structures assigned to Seismic Design Categories C through F are permitted to be taken as 75% of those required by Section 1613, while resulting in reduced seismic performance relative to permanent structures, is consistent with the reduction generally accepted for the evaluation/upgrade of existing buildings and would result in a similar seismic risk to the occupants. Due to the unique lack of warning associated with earthquakes, taking further reductions, even for temporary structures, results in unacceptable, involuntary risk to the occupants. Even for short time frames, the risk to the occupants should be similar, whether it's a temporary or permanent structure. Given the low seismic risk associated with Seismic Design Categories A and B locations, which results in low seismic demands, temporary structures are exempted from designing for seismic loads.

TSUNAMI:

Given that most tsunami-affected areas will have time to respond to a possible inundation, designing temporary structures for tsunami loads was deemed unnecessarily. Rather, temporary structures located in a Tsunami Design Zone will require an Emergency Action Plan that will provide details for evacuating the structure in the event of a tsunami warning.

SNOW:

When snowfall is expected during the service life of a temporary structure, snow loads are determined for surfaces on which snow can accumulate in accordance with Section 1608 and Chapter 7 of ASCE 7. In recognition of the relatively short service life of temporary structures, the ground snow load can be reduced to reflect the relatively low probability that the ASCE 7 ground snow loads will occur during the shorter service life of a temporary structure. The reduction factors of 0.7 and 0.8 in Table 3103.5.1 approximately correspond to 10-year and 20-year MRI for ground snow loads, respectively. If the service life of the temporary structure will not occur during winter months when snow is to be expected, snow loads need not be considered. Similar to wind, an exception is allowed where controlled occupancy actions in Section 3103.7 are adopted, given that on-site management and weather forecasting capabilities allow sufficient time to reduce the risk to occupants by canceling events or reducing the snow loads.

FLOOD:

Temporary structures within riverine and coastal flood zones should be evacuated at the time of loading, therefore the intent of this section is to have a defined plan to secure the structure and minimize the potential for the temporary structure to become floating debris for the surrounding environment. While local flash flooding can occur without advanced warning, the potential hazard area is much more wide-spread and not easily quantified for an enforceable Code provision as part of this cycle. For this reason, there are no requirements for temporary structures outside of a mapped flood zone.

ICE:

When ice can accumulate on a temporary structure during the service life of a temporary structure, ice loads are determined for surfaces on which ice can accumulate in accordance with Section 1614 and Chapter 10 of ASCE 7.

The 0.5-inch nominal ice thickness is based on consideration of the 10-yr and 25-yr mean recurrence interval values. Based on this, the use of a single nominal ice thickness for all locations with a Risk Category II nominal thickness greater than 0.5 inch is recommended. The gust wind speeds in Figure 10.5-1 are concurrent values, rather than extremes, so they should be used in determining wind-ice-loads for temporary ice-sensitive structures.

LOAD FACTORS/RELIABILITY:

The proposed code change is necessary to harmonize the IBC with the IFC since the latter addresses Temporary Special Event Structures and tents that are in service for up to 180 days. The recent pandemic has shown that temporary structures can be in service for more than 180 days and includes structures not regulated within the scope of the IFC.

Given the need to propose load and design criteria for publicly occupied temporary structures based on existing information and standards, the approach presented uses the load and Risk Category criteria in ASCE 7-22. Further analyses may be able to refine these criteria for the next edition of ASCE 7.

EMERGENCY ACTION PLANS:

The code change addresses all the natural hazards and associated environmental loads addressed in IBC chapter 16 and ASCE 7. However, some hazards are more frequent with a likelihood of occurrence during the in-service period or occupancy while others have a remote possibility of occurrence. Emergency Action plans are currently accepted by authorities having jurisdiction for wind loads to reduce the risk to public safety, given the reduced level of reliability relative to new buildings. Flood hazards may be seasonal for example during hurricane seasons or flash flooding is forecast in advance to allow for removal or tying down of installations. They provide the Building Official with the ability to permit a more cost effective alternative than full compliance.

DURABILITY AND MAINTENCE:

Temporary structures are designed to be assembled and disassembled and transported to many locations as components or as modules. Additionally, they may be in service during varying weather conditions. The components may be damaged during transportation or installation. Components may have been manufactured more than a decade prior to the latest use. As a consequence, and unlike a new structure that is typically constructed with new building materials and components that were not previously used, components for temporary structures need to be inspected regularly and suitability for re-use needs to be assessed. This is typically done by the installation crews, and this is similar to bleachers regulated by ICC 300 (Section 501.2). The qualified person is identified by the owner and approved by the Building Official.

Temporary structures are typically assembled utilizing transportable and reusable components that can get damaged in use or during transportation and in use and need to be verified prior to reuse. The most qualified personnel to address whether superficial corrosion is acceptable or whether bent members can be used will be the specifying engineer or the rigging supervisors or owner's management team who tend to be most familiar with the components and the temporary structure's system.

Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will reduce the cost of construction since it proposes reduction to the adopted loads in IBC Ch 16 and ASCE 7. The codes and standards that are in effect under the 2021 edition of the I Codes, with the exception of the International Fire Code regulations for Temporary Special Event Structures, do not provide structural loading criteria adjusted to lower loads for temporary structures that typically have a service life of a few days or weeks not to exceed 1 year.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

3103.5.1.3 Snow. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608~~and Chapter 7 of ASCE 7~~. The ground snow loads, p_g, in Section 1608 shall be modified according to Table 3103.5.1.
If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the public-occupancy *temporary structure* is in service shifts to include winter months.

> **Exception:** Risk Category II *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.

3103.5.1.4 Wind. Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609~~and Chapters 26 to 30 of ASCE 7~~. The design wind load shall be modified according to Table 3103.5.2.

Exceptions

1. *Public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.2.
2. *Public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the design wind speed shall be set at the following 3-second gust basic *wind speeds* depending on *Risk Category*:
   2.1. For *Risk Category* II use 115 mph,
   2.2. For Risk Category III use 120 mph, and
   2.3. For Risk Category IV use 125 mph.

3103.5.1.5 Flood. An Emergency Action Plan, in accordance with 3103.5.4, shall berequired ~~submitted~~ for *public-occupancy temporary structures* in a Flood Hazard Area ~~when requested by the Building or Fire Officia~~l. Where an Emergency Action Plan is approved by the building and fire official, *public* ~~*Public*~~-*occupancy temporary structures* need not be designed for flood loads specified in Section1612. ~~1615 except when specifically designed as a dry floodproofed structure or designated to be occupied during a storm event per the approved Emergency Action Plan.~~

3103.5.1.6 Seismic. Seismic design of ~~loads on~~ *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic loads are permitted to be taken as 75% of those determined by Section 1613. *Public-occupancy temporary structures* assigned to Seismic Design Categories A and B need not be designed for seismic loads.

3103.5.1.7 Ice. Ice loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1614~~, Chapter 10 of ASCE 7~~, with the largest maximum nominal thickness being 0.5 in, for all Risk Categories**.** ~~When ice is expected during the occupancy of *public-occupancy temporary structures*, ice loads shall be determined for surfaces on which ice could accumulate in accordance with ASCE 7.~~ If the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during winter months when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include winter months.

3103.5.4 Emergency Action plans. ~~When required by the *Building Official*,~~ Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating and anchoring or removal of ~~, securing, or dismantling~~ *public-occupancy temporary structures,* ~~in whole or in part, and removal~~to prevent damage to surrounding buildings or structures.

Committee Reason: Approved as modified as the proposal appropriately brings guidance for temporary structures into the IBC. The modification provides clarification, removes redundant language adds a needed language to address the Emergency Action Plan. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3103.5 Structural requirements. *Temporary structures* shall comply with Chapter 16 of this code. *Public-occupancy temporary structures* shall be designed and erected to comply with requirements of this Section.
<u>Temporary non-building structures ancillary to public assemblies or special events structures whose structural failure or collapse would endanger assembled public shall be assigned a risk category corresponding to the risk category of the public assembly. For the purposes of establishing an occupant load for the assembled public endangered by structural failure or collapse, the applicable occupant load determination in Section 1004.5 or 1004.6 shall be applied over the assembly area within a radius equal to 1.5 times the height of the temporary non-building structure.</u>

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be <u>designed in accordance with Sections 3103.5.1.1 through 3103.5.1.9.</u> ~~classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location, and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.~~

Commenter's Reason: This public comment is being submitted to clarify the original proposal. It address non-building structures such as lighting or audio equipment stands or camera stands that are associated with public-occupancy temporary structures and special event structures, and can pose a danger to the public if they fail. The intent of this public comment is to say that they should be designed with the appropriate risk category in mind.
The current code is not clear as to how these structures should be classified. IBC Table 1604.5 only says "certain" temporary structures get assigned to Risk Category I. There is no definition of which temporary structures qualify as "certain." The importance factors associated with Risk Category I reduce the required loads these structures are designed to withstand. While Risk Category I may be appropriate for temporary structures that will not affect the public, it is inappropriate where their failure would likely inure or kill people. These types of structures are classified as non-building structures in ASCE 7, and do not fall directly under the definitions of public-occupancy temporary structures or special event structures, since they generally aren't occupied. However, they can still pose a significant danger to people who are assembled nearby, if they should fail.

The original proposal contained a requirement that these all of these ancillary structures should be assigned to Risk Category III. However, this could be viewed as being more restrictive than is required for new construction of, for example, a small theater. In addition, the original proposal did not give guidance as to how to apply the code provisions, since many times the structures are associated with outdoor assembly events whereas the current code generally envisions addressing assemblies within a building.

This public comment requires these non-building structures to be assigned a risk category that is consistent with the risk category associated with the nearby public assembly. If the nearby assembled public would be classified under Risk Category III, any stands that can fall on them should also be Risk Category III. Stands associated with smaller assemblies may get classified as Risk Category II.

In this case, "nearby" is quantified as being an area within 1.5 times the height of the non-building structure. This is consistent with recommendations from the California Building Officials association (CALBO) for the "fall zone" around buildings damaged in earthquakes when conducting ATC-20 building safety evaluations. Those recommendations suggest that building safety evaluators cordon off or barricade for a distance of 1.5 times the height of a damaged building in danger of collapsing to protect the public from building materials that can also shatter and bounce. (Ref. FEMA P-2055, *Post-disaster Building Safety Evaluation Guidance*, November 2019.) The intent of this public comment is to view the assembled public exposed to this falling hazard as being within an area where a radius equal to 1.5 times the height of the non-building structure overlaps the public assembly area. The occupant load used to determine the risk category is determined by counting fixed seats within that overlapping area (Section 1004.6) or applying the appropriate occupant load factors in Table 1004.5 to that area (Section 1004.5).

This public comment is being proposed as an addition to the three WABO TCD/SEI public comments. If all four public comments are approved, the change in Section 3103.5 in this public comment would appear as a second paragraph below the new exception, and the change in Section 3103.5.1 would not override the change in the other public comment. The final result if all four are approved would appear as follows:

3103.5 Structural requirements. Temporary structures shall comply with the structural requirements of this code. Public-occupancy temporary structures shall be designed and erected to comply with the structural requirements of this code and Sections 3103.5.1 through 3103.5.7.

Exception: Where approved, live loads less than those prescribed by Table 1607.1 shall be permitted provided a registered design professional demonstrates that a rational approach has been used and that such reductions are warranted.

Temporary non-building structures ancillary to public assemblies or special events structures whose structural failure or collapse would endanger assembled public shall be assigned a risk category corresponding to the risk category of the public assembly. For the purposes of establishing an occupant load for the assembled public endangered by structural failure or collapse, the applicable occupant load determination in Section 1004.5 or 1004.6 shall be applied over the assembly area within a radius equal to 1.5 times the height of the temporary non-building structure.

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be designed in accordance with Chapter 16, except as modified by Sections 3103.5.1.1 through 3103.5.1.6.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The original cost impact statement says this proposal will decrease the cost of construction. However, a timed egress analysis for each of these public-occupancy temporary structures will add cost. The change to eliminate that in this public comment will reduce the cost of the original proposal. The change regarding ancillary structures allows some of them to remain under Risk Category II, as opposed to being pushed to Risk Category III, and will therefore reduce costs compared to the original proposal.

Public Comment 2

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3103.1.1 Extended period of service time. *Public-occupancy temporary structures* shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures when extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and when the following conditions are satisfied:

1. Additional inspections as determined by the *Building Official* shall be performed by a qualified person to verify that site conditions and the approved installation comply with the conditions of approval at the time of final inspection.
2. ~~The *Building Official*~~ A qualified person shall perform follow up inspections after initial occupancy at intervals not exceeding 180 days to verify the site conditions and the installation conform to the approved site conditions and installation requirements. Inspection records shall be kept and shall be made available for verification by the Building Official.
3. An examination shall be performed by a registered design professional to determine the adequacy of the *temporary structure* to resist the structural loads required in Section 3103.5.
4. Relocation of the *public-occupancy temporary* ~~*structures*~~*structure* shall require a new ~~approval by the *Building Official*~~ permit application.
5. The use or occupancy approved at the time of final inspection shall remain unchanged.
6. A request for an extension is submitted to the building official. The request shall include records of the inspections and examination in Items 1 and 3 above.

Commenter's Reason: This public comment is intended to improve the enforceability of this proposal. As written, the proposal requires the building official to track and conduct ongoing inspections of these structures after the Certificate of Occupancy is issued. Unless there is work being done that requires a permit, what happens after the CofO is issued is not normally regulated by the building official. For many jurisdictions, this would require setting up a system similar to Temporary CofOs to keep track of these and trigger the required inspections.

For those jurisdiction who have an electronic permit tracking system, this is less onerous than for those who are still working in a paper system, but even with electronic permitting, setting up the system may not be a negligible effort.
The biggest changes proposed by this public comment are in Items 1 and 2. Instead of requiring the building official to track these, this public comment puts the onus on the owner and their "qualified person" to provide the additional inspections in Item 1, and the ongoing inspections in Item 2. For the ongoing inspections, the qualified person is required to keep the records, should the building official or their delegee wants to review them. These changes make the process very similar to the process for special inspections in Chapter 17, where the building official relies on a special inspector or agency for many of the details of construction.

The change to Item 4 clarifies this applies to public-occupancy temporary structures (not all temporary structures), and that the owner will need to apply for a new permit and go through the full permit process for relocated public-occupancy temporary structures, as opposed to getting an undefined "new approval" from the building official.

Regarding the new Item 6, the apparent intent of the original proposal is that the extension is granted without requiring the owner to go through the normal permit application process. This public comment clarifies the request has to be submitted to the building official, and that reports resulting from the inspections by the qualified person and the registered design professional's "examination" must be submitted along with the request. The jurisdiction's process will determine what form the request takes (written or electronic).This public comment is one of a series of three being submitted by WABO TCD and ASCE to improve this proposal. This public comment is not intended to override the editorial change being made to Section 3103.1.1 by one of the other comments (changing "when" to "where" in two places). For reference, we have developed a clean version of the proposal that incorporates all three public comments (see link below), showing how the final code language for the entire change should appear, should all three public comments be approved.

https://www.cdpaccess.com/public-comment/3147/27095/files/download/3599/S116-22%20Temp%20Structures%20-%20Combined%20SIU%205-6-12%20PCs%20%28clean%29.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The original proposal states the cost of construction will decrease. This public comment does not change the proposal's effect on the initial cost of construction, since it applies to ongoing maintenance and inspections after the initial Certificate of Occupancy is issued. However, the public comment will increase the costs to the owner relative the original proposal, since the owner will be required to hire/retain the "qualified person" to conduct the ongoing inspections. Because the original proposal is unclear on the qualifications of the "qualified person," and because of the variability in the size and complexity of the temporary structures being regulated, it is not possible to put an accurate dollar value on the additional cost. But supposing the "qualified person" is an engineer who charges $300/hour for their services, and it takes 3 hours to conduct the required inspections, the cost for each inspection would be less than $1000. On the other hand, this public comment will decrease the costs for the building official's jurisdiction relative to the original proposal, since the jurisdiction won't be required to incorporate ongoing inspections and tracking into their processes and workload. The building official will only incur costs if they choose to follow up on these structures.

Public Comment 3

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3103.5.1.3 Snow. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608. The ground snow loads, p_g, in Section 1608 shall be modified according to Table 3103.5.1.3.
~~If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during winter months when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the public-occupancy *temporary structure* is in service shifts to include winter months~~.

> **Exception:** Risk Category II *public-occupancy temporary structures* that employ controlled occupancy ~~measures~~ procedures per Section ~~3103.7.2~~ 3103.7 shall be permitted to use a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table 3105.1.3.

Where the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during times when snow is to be expected, snow loads need not be considered, provided that where the period of time when the public-occupancy temporary structure is in service shifts to include times when snow is to be expected, either of the following conditions is met:

1. The design is reviewed and modified, as appropriate, to account for snow loads; or
2. Controlled occupancy procedures in accordance with Section 3103.7 are implemented.

3103.5.1.4 Wind. Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609. The design wind load shall be modified according to Table 3103.5.1.4.

Exceptions

1. *Public-occupancy temporary structures* that ~~employ~~ implement controlled occupancy ~~measures~~ procedures per Section ~~3103.7.1~~ 3103.7 shall be permitted to use a load reduction factor of 0.65 instead of the load reduction factors in Table 3103.5.1.4.
2. *Public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the design wind speed shall be set at the following 3-second gust basic *wind speeds* depending on *Risk Category*:
    - 2.1. For *Risk Category* II use 115 mph,
    - 2.2. For Risk Category III use 120 mph, and
    - 2.3. For Risk Category IV use 125 mph.

3103.5.1.5 Flood. ~~An Emergency Action Plan , in accordance with Section 3103.5.4, shall be required for*public-occupancy temporary structures* in a Flood Hazard Area. Where an Emergency Action Plan is approved by the building and fire official,*public*~~ Public-*occupancy temporary structures* need not be designed for flood loads specified in Section1612.Controlled occupancy procedures in accordance with Section 3103.7 shall be implemented.

3103.5.1.7 Ice. Ice loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1614 with the largest maximum nominal thickness being 0.5 in, for all Risk Categories**.** ~~If~~ Where the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during ~~winter months~~times when ice is to be expected, ice loads need not be considered, provided that where the period of time when the temporary structure is in service shifts to include times when ice is to be expected, either of the following conditions is met:

1. ~~the~~ The design is reviewed and modified, as appropriate, to account for ice loads~~if the period of time when the temporary structure is in service shifts to include winter months~~; or
2. Controlled occupancy procedures in accordance with Section 3103.7 are implemented.

3103.5.1.8 Tsunami. ~~An Emergency Action Plan, in accordance with Section 3103.5.4, shall be submitted for*public-occupancy temporary structures* in a Tsunami Design Zone when requested by the Building or Fire Official. The*public*~~Public-*occupancy temporary* ~~*structure*~~ *structures* in a tsunami design zone need not be designed for tsunami loads specified in Section 1615. Controlled occupancy procedures in accordance with Section 3103.7, shall be implemented.

~~**3103.5.4 Emergency Action plans.** Emergency Action Plans shall be submitted and approved. Emergency Action Plans shall include procedures to be implemented due to flood, wind, or snow hazards, or within the tsunami design zone. The action plans shall include provisions for evacuating and anchoring or removal of*public-occupancy temporary structures*, to prevent damage to surrounding buildings or structures.~~

~~3103.5.5~~3103.5.4 Durability and maintenance. [Text unchanged]

3103.7 Controlled occupancy procedures. ~~*Public-occupancy temporary structures* that comply with Section 3103.5 for structural requirements do not require monitoring for controlled occupancy.~~ Where controlled occupancy procedures are required to be implemented for ~~*Public*~~*public-occupancy temporary structures* ~~that employ exceptions for reduced environmental loads shall employ controlled occupancy procedures as specified~~ in Section 3103.5.1, the procedures shall comply with this section and ~~in accordance with~~ ANSI ES1.7. An operations management plan ~~conforming to~~ in accordance with ANSI E1.21 ~~with an occupant evacuation plan~~ shall be submitted to the

Building Official for approval as a part of the permit documents. In addition, the operations management plan shall include an emergency action plan that documents the following information, where applicable:

1. Surfaces on which snow or ice accumulates shall be monitored before and during occupancy of the public-occupancy temporary structure. Any loads in excess of the design snow or ice load shall be removed prior to its occupancy, or the public-occupancy temporary structure shall be vacated in the event that either the design snow or ice load is exceeded during its occupancy.
2. Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the public-occupancy temporary structure. The public-occupancy temporary structure shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.
3. Criteria for initiating occupant evacuation procedures for flood and tsunami events.
4. Occupant evacuation procedures shall be specified for each environmental hazard where the occupant management plan specifies the public-occupancy temporary structure is to be evacuated.
5. Procedures for anchoring or removal of the public-occupancy temporary structure, or other additional measures or procedures to be implemented to mitigate hazards in snow, wind, flood, ice, or tsunami events.

~~3103.7.1 Wind.~~ ~~Wind speeds associated with the design wind loads shall be monitored before and during occupancy of the~~ ~~*public-occupancy temporary structure*. The *public-occupancy temporary structure* shall be vacated in the event that the design wind speed is expected to be exceeded during its occupancy.~~

~~3103.7.2 Snow.~~ ~~Surfaces on which snow accumulates shall be monitored before and during occupancy of the *public-occupancy temporary structure* and any loads in excess of the design snow load shall be removed prior to its occupancy, or the *public-occupancy temporary structure* shall be vacated in the event that the design snow load is exceeded during its occupancy~~.

~~3103.7.3 Ice.~~ ~~Surfaces on which ice accumulates shall be monitored before and during occupancy of the *public-occupancy temporary structure* and any loads in excess of the design ice load *shall* be removed prior to its occupancy, or the *public-occupancy temporary structure* shall be vacated in the event that the design ice load is exceeded during its occupancy~~.

Commenter's Reason: This public comment is intended to coordinate, clarify, and simplify the requirements surrounding the proposed emergency action and operations management plans. As written, the proposal is confusing as to whether the emergency action plan is a separate document from the operations management plan, yet it seems that the (minimal) elements outlined in the section on emergency action plans are, or should be, included in the operations management plan. This public comment places requirements for an emergency action plan within the requirements for controlled occupancy procedures, revises the section on controlled occupancy, and makes other editorial changes to coordinate the applicable sections. Specifically:

- "Controlled occupancy measures" is replaced in the snow and wind sections (exceptions in 3103.5.1.3 and 3103.5.1.4) with "controlled occupancy procedures" to be consistent with Section 3103.7. This is intended to eliminate confusion as to whether "measures" are different from "procedures."
- Requirements for an "emergency action plan" for floods and tsunamis (3103.5.1.5 and 3103.5.1.8) is replaced with a requirement to employ controlled occupancy procedures. This is intended to make the language consistent among the sections, and coordinates with changes to 3103.7. The order of the sentences in both sections has been revised to lead off with the load (non-) requirement, since 3103.5.1 is generally about environmental loads.
- Provisions allowing controlled occupancy procedures for snow have been modified to allow for regional differences in expected snow events. The original proposal referred to "winter months," but there are areas that can expect snow events year-round.
- An allowance to implement controlled occupancy procedures is added to ice loads (3103.5.1.7) as an option to redesigning the structure if the occupancy extends into times when ice is to be expected. This makes the ice provisions parallel with snow, and coordinates this section with 3103.7.3 in the original proposal (3103.7, Item 2 in this public comment).
- Section 3103.5.4 (Emergency action plans) is deleted, since there is a requirement for an operations management plan in 3103.7, which includes an emergency action plan. In addition, the sentence regarding protection of surrounding structures not only should be part of the controlled occupancy procedures, but also fails to recognize that people should be protected from the hazards created by these structures.
- With the deletion of 3103.5.4, the section that follows (durability and maintenance) has been renumbered.

- Besides retitling the section to refer to controlled occupancy procedures, Section 3103.7 has been substantially rewritten and reformatted.
    - The first sentence stating controlled occupancy monitoring (procedures? measures?) are not required is unnecessary and in the cases of flood and tsunami, conflicts with the requirement for an emergency action plan (now part of the operations management plan). The sentence has been deleted without replacement.
    - The first modification to the next sentence simplifies and clarifies the trigger language for controlled occupancy procedures. As written, the requirement that appeared to say controlled occupancy procedures were required where any environmental load is reduced in 3103.5 conflicted with the actual provisions--only certain reductions require the procedures. This has been clarified by referring back to triggers in 3103.5.1.
    - ANSI E1.21 contains requirements for monitoring the weather and forecast for high winds, tornadoes, thunderstorms, lightning, and other "severe conditions," as well as a requirement for mitigating actions for ice and snow to be specified in the operations management plan. These appear to overlap with the originally-proposed emergency action plan. This public comment now requires an emergency action plan be included in the operations management plan, and that some additional information needs to be provided.
    - The originally-proposed wind, snow, and ice subsections of 3103.7 provide some additional guidance on mitigating activities that should be included in the operations management plan. Subsections 3103.7.1 through 3103.7.3 in the original proposal have been reformatted as numbered items in Section 3103.7, for clarity and to make the charging language simpler.
        - Subsections 3103.7.2 and 3103.7.3 have been combined in the new Item 1 since the language in each of the subsections was identical except for the hazard.
        - Subsection 3103.7.1 is now Item 2. The change in order of presentation is so the items will appear in the same order as they appear in Section 3103.5.1 (snow before wind).
        - The new Item 3 clarifies the operations management plan needs to specify what triggers evacuation for flood and tsunami events.
        - The new Item 4 requires the operations management plan to specify the procedures for evacuation, once those procedures are triggered.
        - The new Item 5 is a catch-all for any other necessary procedures, and incorporates requirements from the deleted section on emergency action plans.

This public comment is one of a series of three being submitted by WABO TCD and ASCE to improve this proposal. This public comment is intended to be melded together with the changes proposed by the other two public comments. Because this public comment is proposing very substantive changes to the original proposal, it is being submitted for separate consideration at the Public Comment Hearings. Thus, in some cases, if this public comment is approved, it will override the other public comments, and in others (particularly for editorial changes), the other public comments are intended to govern. For reference, we have developed a clean version of the proposal that incorporates all three public comments (see link below), showing how the final code language for the entire change should appear, should all three public comments be approved.

https://www.cdpaccess.com/public-comment/3147/27095/files/download/3599/S116-22%20Temp%20Structures%20-%20Combined%20SIU%205-6-12%20PCs%20%28clean%29.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The original cost impact statement says this proposal will decrease the cost of construction. This public comment clarifies and reformats the proposal, and therefore, will have no effect on the original cost impact statement.

Public Comment 4

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

PUBLIC-OCCUPANCY TEMPORARY STRUCTURE. Any building or structure erected for a period of one year or less thatserves an assembly occupancy or other public use. ~~*support public or private assemblies*, or that provide human shelter, protection, or safety. Public-occupancy temporary structures within the confines of another existing structure (such as convention booths) are exempted from Section 3103.5.~~

CHAPTER 31 SPECIAL CONSTRUCTION

SECTION 3103 TEMPORARY STRUCTURES

3103.1 General. The provisions of Sections 3103.1 through 3103.7 shall apply to structures erected for a period of less than 180 days. Temporary *special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code* . *Temporary structures* erected for a longer period of time and*public-occupancy temporary structures* shall comply with applicable sections of this code.

~~Exception~~Exceptions:

1. *Public-occupancy temporary structures* complying with Section 3103.1.1 shall be permitted to remain in service for 180 days or more but not more than 1 year ~~when~~ where approved by the *Building Official*.
2. *Public-occupancy temporary structures* erected within the confines of an existing structure are not required to comply with Section 3103.5.

3103.1.1 Extended period of service time. *Public-occupancytemporary structures* shall be permitted to remain in service for 180 days or more without complying with requirements in this code for new buildings or structures ~~when~~ where extensions for up to 1 year are granted by the *Building Official* in accordance with Section 108.1 and~~when~~ where the following conditions are satisfied:
[No change to conditions]

3103.5 Structural requirements. *Temporary structures* shall comply with ~~Chapter 16~~ the structural requirements of this code. *Public-occupancy temporary structures* shall be designed and erected to comply withthe structural requirements of this ~~Section~~ code and Sections 3103.5.1 through 3103.5.7.

Exception: Where approved, live loads less than those prescribed by Table 1607.1 shall be permitted, provided a registered design professional demonstrates that a rational approach has been used and that such reductions are warranted.

3103.5.1 Structural loads. *Public-occupancy temporary structures* shall be designed in accordance with Chapter 16, except as modified by Sections 3103.5.1.1 through 3103.5.1.6. ~~classified, based on the risk to human life, health, and welfare associated with damage or failure by nature of their occupancy or use, according to Table 1604.5 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Additionally, public assembly facilities that require more than 15 min to evacuate to a safe location and any structure whose failure or collapse would endanger the public assembled near the structure, such as speaker stands or other temporary structures for public gatherings shall be classified as Risk Category III.~~

~~**3103.5.1.1 Dead.** Dead loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1606~~.

~~**3103.5.1.2 Live.** Live loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1607~~.

~~**Exception**: Where *approved, live loads* less than those prescribed by Table 1607.1*Minimum Uniformly Distributed Live Loads,* L_0*, and Minimum Concentrated Live Loads* shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.~~

~~3103.5.1.3~~ 3103.5.1.1 Snow loads. Snow loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1608. The ground snow loads, p_g, in Section 1608 shall bepermitted to be modified ~~according to~~ in accordance with the ground snow load reduction factors in Table ~~3103.5.1.3~~3103.5.1.

If the *public-occupancy temporary structure* is not subject to snow loads or not constructed and occupied during~~winter months~~times when snow is to be expected, snow loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for snow loads if the period of time when the public-occupancy *temporary structure* is in service shifts to include~~winter months~~times when snow is to be expected.

> **Exception:** Ground snow loads, p_g, for ~~Risk Category II~~ *public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.2 shall be permitted to ~~use~~ be modified using a ground snow load reduction factor of 0.65 instead of the ground snow load reduction factors in Table ~~3105.1.3~~ 3103.5.1.

~~3103.5.1.4~~ 3103.5.1.2 Wind loads. ~~Wind loads on *public-occupancy temporary structures* shall be determined in accordance with Section 1609.~~ The design wind load on *public-occupancy temporary structures* shall be permitted to be modified ~~according to~~ in accordance with the wind load reduction factors in Table ~~3103.5.1.4~~3103.5.2.

Exceptions

1. Design wind loads on ~~*Public*~~*public-occupancy temporary structures* that employ controlled occupancy measures per Section 3103.7.1 shall be permitted to ~~use~~ be modified using a wind load reduction factor of 0.65 instead of the load reduction factors in Table ~~3103.5.1.4~~ 3103.5.2.
2. For ~~*Public*~~*public-occupancy temporary structures* erected in a hurricane-prone region outside of hurricane season, the~~design~~ *basic wind speed*, *V*, shall be permitted to be set ~~at the following 3-second gust basic *wind speeds*~~as follows, depending on *Risk Category*:
   - 2.1. For *Risk Category* II use 115 mph,
   - 2.2. For Risk Category III use 120 mph, and
   - 2.3. For Risk Category IV use 125 mph.

~~3103.5.1.5~~ 3103.5.1.3 Flood loads. An Emergency Action Plan, in accordance with Section 3103.5.4, shall be required for*public-occupancy temporary structures* in a Flood Hazard Area. Where an Emergency Action Plan is approved~~by the building and fire official~~, *public occupancy temporary structures* need not be designed for flood loads specified in Section1612.

~~3103.5.1.6~~ 3103.5.1.4 Seismic loads. ~~Seismic design of *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be determined in accordance with Section 1613. The resulting seismic~~ Seismic loads on *public-occupancy temporary structures* assigned to Seismic Design Categories C through F shall be~~are~~ permitted to be taken as 75% of those determined by Section 1613. *Public-occupancy temporary structures* assigned to Seismic Design Categories A and B need not be designed for seismic loads.

~~3103.5.1.7~~ 3103.5.1.5 Ice loads. Ice loads on *public-occupancy temporary structures* shall be permitted to be determined ~~in accordance with Section 1614~~ with the largest maximum nominal thickness being 0.5~~in~~ inches (13 mm), for all Risk Categories. ~~If~~ Where the *public-occupancy temporary structure* is not subject to ice loads or not constructed and occupied during~~winter months~~times when ice is to be expected, ice loads need not be considered, provided that the design is reviewed and modified, as appropriate, to account for ice loads if the period of time when the temporary structure is in service shifts to include ~~winter months~~times when ice is to be expected.

~~3103.5.1.8~~ 3103.5.1.6 Tsunami loads. An Emergency Action Plan, in accordance with Section 3103.5.4, shall be submitted for *public-occupancy temporary structures* in a Tsunami Design Zone~~when requested by the Building or Fire Official~~. The *public-occupancy temporary structure* need not be designed for tsunami loads specified in Section 1615.

3103.5.2 Foundations. *Public-occupancy temporary structures* ~~may~~ shall be permitted to be supported on the ground with temporary foundations ~~when~~ where approved by the Building Official. Consideration shall be given for the impacts of differential settlement~~when~~ where foundations do not extend below the ground or foundations supported on compressible materials. The presumptive load-bearing value for *public-occupancy temporary structures* supported on a pavement, slab on grade or on other*Collapsible or Controlled Low Strength* substrates soils such as beach sand or grass shall be assumed not to exceed 1,000 psf unless determined through testing and evaluation by a registered design professional. The presumptive load-bearing values listed in Table 1806.2 shall be permitted to be used for other supporting soil conditions.

3103.5.3 Installation and maintenance inspections. A qualified person shall inspect *public-occupancy temporary structures* that are assembled using transportable and reusable materials; components shall be inspected when purchased or acquired and at least once per year. The inspection shall evaluate individual components, and the fully assembled structure, to determine suitability for use based on the requirements in ESTA ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *Building Official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in serviceto ensure that the structure continues to perform as designed and initially erected.

3103.5.5 Durability ~~and maintenance~~. Reusable components used in the erection and the installation of *public-occupancy temporary structures* shall be manufactured of durable materials necessary to withstand environmental conditions at the service location. Components damaged during transportation or installation and due to the effects of weathering shall be replaced or repaired.
~~A qualified person shall inspect *public-occupancy temporary structures*, including components, when purchased or acquired and at least once per year, based on the requirements in ANSI E1.21. Inspection records shall be kept and shall be made available for verification by the *building official*. Additionally, *public-occupancy temporary structures* shall be inspected at regular intervals when in service to ensure that the structure continues to perform as designed and initially erected.~~

CHAPTER 16 STRUCTURAL DESIGN

1608.1 General. Design snow *loads* shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof *load* shall be not less than that determined by Section 1607.

Exception: *Temporary structures* complying with Section ~~3103.5.1.3~~3103.5.1.1.

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.
7. *Temporary structures* complying with Section ~~3103.5.1.4~~3103.5.1.2.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic design wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24.

Exception: *Temporary structures* complying with Section ~~3103.5.1.5~~3103.5.1.3.

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.
6. *Temporary structures* complying with Section ~~3103.5.1.6~~3103.5.1.4.

1614.1 General. *Ice-sensitive structures* shall be designed for atmospheric ice*loads* in accordance with Chapter 10 of ASCE 7.*Public-occupancy temporary structures* shall comply with Section 3103.7.3.

Exception: *Temporary structures* complying with Section ~~3103.5.1.7~~3103.5.1.5.

1615.1 General. The design and construction of *Risk Category* III and IV buildings and structures located in the *Tsunami Design Zones* defined in the *Tsunami Design Geodatabase* shall be in accordance with Chapter 6 of ASCE 7, except as modified by this code.

Exception: *Temporary structures* complying with Section ~~3103.5.1.8~~3103.5.1.6.

Commenter's Reason: This public comment is being submitted to clarify the original proposal by making editorial changes, some minor changes that are technically substantive, and several clearly substantive changes. We believe this will result in a more reasonable, understandable, and enforceable code.
The substantive changes:

- Modify the definition of "public-occupancy temporary structure."
  - As proposed, this definition is overly-broad. A building or structure that "provide[s] human shelter, protection, or safety" makes any building fall under this definition. Second, the use of "support" in the definition can cause confusion whether this is intended to mean structural support, or just be associated with the assemblies. Third, including "private assemblies" is confusing when the defined term is "public." Lastly, the second sentence in the definition is an exception to a code requirement that does not belong in a definition.
  - This public comment addresses the issues above by changing "supports" to "serves," changes "public and private assemblies" to "assembly occupancies," moves the second sentence to an exception to the scoping of Section 3103.1, and replaces the reference to shelter/protection/safety with "public use."
    - "Serves" still brings the ancillary structures associated with temporary assemblies into these regulations, but doesn't confuse the issue of whether the structure needs to provide actual structural support for a stage, for example, in order for these regulations to apply.
    - The term "public use" was chosen to give the building official the flexibility to interpret it as needed, but to convey the idea the "public" had to be using the structure. Thus, the intent is to include structures like temporary COVID vaccination and testing facilities, field hospitals, or emergency shelter for people experiencing homelessness (e.g., "tiny home" villages), but not include temporary structures, for example, that only provide shelter for materials like cement bags or highway salt/sand.
- Delete the requirements related to Risk Category (Section 3103.5.1).
  - The main reason for the deletion is that the original proposal made some substantive modifications to the Risk Category table (1604.5) that we do not think were appropriate. First, it would have required a computerized timed egress analysis to prove these structures could be evacuated in 15 seconds, or else it would get thrown into Risk Category III. Second, it would require those temporary structures serving any assembly occupancy (speaker stands, light standards, etc.) to be classified as Risk Category III, which could be a more stringent classification than if they were permanent.
  - Ultimately, we think Risk Category should just be determined by Section 1604.5, and not modified here.

- Delete the Risk Category II limitation for reducing the snow loads (Section 3103.5.1.1, Exception).
  - The deletion creates consistency with use of the reduction factors for the wind and ice loads where controlled occupancy procedures are being used.
  - In addition, if controlled occupancy procedures are implemented (for example, evacuating the public-occupancy temporary structure), there is no reason why the same reduction factors could not be applied to structures in a higher risk category.

- Change references to "winter months" in the snow and ice sections to be more generic (Sections 3103.5.1.1 and 3103.5.1.5)
  - As we were collaborating with others on this, it was pointed out that some areas of the country have snow and ice events at times other than the winter months--in some cases, year-round. This public comment changes those references to refer to times when snow or ice "is to be expected," to allow for those regional differences.

- Require an Emergency Action Plan whenever a public-occupancy temporary structure is located in a tsunami design zone (Section 3103.5.1.6).
  - The original proposal made this only a requirement when the building or fire official asked for one. We believe that you should have should have an evacuation plan, along with triggers for initiating the plan whenever these are located in areas subject to tsunami inundation, similar to the flood loads section. These should be included in the Emergency Action Plan.

The technically substantive changes:

- Modifies the exception to Section 3103.5 (moved from the deleted 3103.5.1.2 on live loads) to refer to "a" registered design professional, rather than "the" registered design profession. The latter implies a specific person, which gets into contractural arrangements that the building code should not be regulating.
- Make all the load reductions in Section 3103.5.1 optional ("shall be permitted to be"), instead of making them mandatory per the original proposal.
- Aligns the wind speed terminology in the renumbered Section 3103.5.1.2 (wind loads) with the terminology used in S9-22 (Approved as Submitted by the Structural Committee)

The editorial changes:

- Makes the new text in Section 3103.5.1 (structural loads) charging for the rest of the section, saying to comply with the structural loads in Chapter 16, unless the following subsections modify them. This allows deletion of the dead and live load subsections since they didn't modify Chapter 16, and allows deletion of any pointers to Chapter 16 sections in the remaining subsections.
- Align the language among the sections (use parallel construction),
- Use traditional code language ("where" instead of "if" or "when," and "shall be permitted" instead of "may")
- Modify references to the load reduction tables to reflect the correct table numbers.
- Deletes the unnecessary table title in the relocated exception to Section 3103.5, and rearranges the text of the exception so the registered design professional needs to "demonstrate" the lower loads are justified.
- Reorganize some of the provisions as follows:
  - The exception within the definition of "public-occupancy temporary structure" becomes a second exception to the scoping in Section 3103.1. (See the substantive change to the definition, above.)
  - With the deletion of the live loads section (see substantive change to 3103.5.1 above), the exception that used to be in the live loads section is moved to the general charging for structural requirements (Section 3103.5).
  - A redundant provision for maintenance inspections is deleted from Section 3103.5.5 (Durability) and the statement of purpose fo the inspections that was in deleted language is now included to Section 3105.3 (installation and maintenance inspections).
- Modify the references in the Chapter 16 exceptions to reflect the new organization.

This public comment is one of a series of three being submitted by WABO TCD and ASCE to improve this proposal. This public comment is not intended to override any substantive or organizational changes being made by the other comments. For reference, we have developed a clean version of the proposal that incorporates all three public comments (see link below), showing how the final code language for the entire change should appear, should all three public comments be approved.

https://www.cdpaccess.com/public-comment/3147/27095/files/download/3599/S116-22%20Temp%20Structures%20-%20Combined%20SIU%205-6-12%20PCs%20%28clean%29.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The original cost impact statement says the cost of construction will decrease. The editorial changes, minor substantive changes, and the

change to the definition are clarifications that will have no effect on the original cost impact statement. The elimination of a requirement for a timed-egress analysis to avoid Risk Category III will reduce the cost of construction as compared to the original proposal, but overall, will have no effect on the original cost impact statement.

Final Hearing Results

S116-22	AMPC1,2,3,4

S117-22

Original Proposal

IBC: SECTION 202, 1608.3, 1611.2, ASCE/SEI Chapter 35 (New)

Proponents: Nathalie Boeholt, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Building Code

Delete without substitution:

~~**[BS] SUSCEPTIBLE BAY.** A roof or portion thereof with either of the following~~:

1. ~~A slope less than $^1/_4$-inch per foot (0.0208 rad).~~
2. ~~On which water is impounded, in whole or in part, and the secondary drainage system is functional but the primary drainage system is blocked.~~

~~A roof surface with a slope of $^1/_4$-inch per foot (0.0208 rad) or greater towards points of free drainage is not a susceptible bay.~~

Revise as follows:

1608.3 Ponding instability. ~~*Susceptible bays* of roofs shall be evaluated for ponding~~ Ponding instability on roofs shall be evaluated in accordance with ~~Chapters 7 and 8 of~~ ASCE 7.

1611.2 Ponding instability. ~~*Susceptible bays* of roofs shall be evaluated for ponding~~ Ponding instability on roofs shall be evaluated in accordance with ~~Chapters 7 and 8 of~~ ASCE 7.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: Section 1608.3 (Snow Loads-Ponding instability) and section 1611.2 (Rain Loads-Ponding instability) refer to the defined term “Susceptible Bay” for ponding instability evaluation. The referenced standard ASCE 7-22 has eliminated the defined term "Susceptible Bay" but still takes ponding into account for snow and rain loads. This proposal will help align the Building Code with the ASCE 7-22 standard by removing this term. This proposal also shortens the code language with a simple reference to ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is only an editorial change and does not change the technical requirements for ponding consideration. There will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22 for ponding instability. (Vote: 13-0)

Final Hearing Results

S117-22	AS

S119-22 Part I

Original Proposal

IBC: 1609.2.2, 1609.2.3

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Delete without substitution:

~~**1609.2.2 Application of ASTM E1996.** The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows:~~

~~6.2.2 Unless otherwise specified, select the wind zone based on the basic design *wind speed*, *V*, as follows:~~

~~6.2.2.1 *Wind Zone 1*—130 mph ≤ basic design *wind speed*, *V* < 140 mph.~~

~~6.2.2.2 *Wind Zone 2*—140 mph ≤ basic design *wind speed*, *V* < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.~~

~~6.2.2.3 *Wind Zone 3*—150 mph (67 m/s) ≤ basic design *wind speed*, *V* ≤ 160 mph (72 m/s), or 140 mph (63 m/s) ≤ basic design *wind speed*, *V* ≤ 160 mph (72 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.~~

~~6.2.2.4 *Wind Zone 4*— basic design *wind speed*, *V* > 160 mph (72 m/s).~~

Revise as follows:

~~**1609.2.3**~~ **1609.2.2 Garage doors.** Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact-resisting standard or ANSI/DASMA 115.

Reason: This proposal removes the technical criteria that is redundant with the current reference standards ASTM E1996-20 and ASCE7-22. ASTM E1996 has changed to ultimate design from strength design and reduced the wind zones from 4 to 3. The 'correction' as specified in IBC Section 1609.2.2 and IRC Section R301.2.1.2.1 is no longer needed with the current ASTM E1996-20 and ASCE 7-22. ASCE 7-10 changed the basis of its wind speed maps from allowable stress-level wind speeds to strength design-level wind speeds. However, due to the timing of the ICC code development cycle leading to the 2012 IBC and IRC and of the ASTM cycle for updating E1996, there was not enough time to correlate and update the wind speeds associated with the E1996 wind zones. Section 1609.2.2 was introduced as a temporary measure to correlate the E1996 wind zones with ASCE 7-10.

In addition, Wind Zone 4 was modified to trigger at a higher wind speed as was specified in E1996 at the time. Wind Zone 4 was originally introduced to bring Miami-Dade County on board with accepting ASTM E1996 as equivalent to the TAS 102. The IBC and IRC raised the Wind Zone 4 trigger as the ASCE 7-10 wind maps would have otherwise resulted in Wind Zone 4 extending beyond Miami-Dade County.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Removing the IBC and IRC modification will not change any design or testing requirements as the wind zone definitions in E1996 largely match those in the modification. It may reduce confusion in southern Florida by removing reference to Wind Zone 4, which no longer exists in E1996.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted consistent with the actions on S119-22 Part II. The indicated sections are no longer necessary. (Vote: 14-0)

Final Hearing Results

S119-22 Part I	AS

S119-22 Part II

Original Proposal

IRC: R301.2.1.2.1

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Delete without substitution:

~~**R301.2.1.2.1 Application of ASTM E1996.** The text of Section 2.2 of ASTM E1996 shall be substituted as follows~~:
~~2.2 ASCE Standard:~~

~~ASCE 7-10 American Society of Civil Engineers *Minimum Design Loads for Buildings and Other Structures*~~

~~The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows~~:

~~6.2.2 Unless otherwise specified, select the wind zone based on the ultimate design wind speed, V_{ult}, as follows:~~

~~6.2.2.1 Wind Zone 1-130 mph ≤ ultimate design wind speed, V_{ult} < 140 mph.~~

~~6.2.2.2 Wind Zone 2-140 mph ≤ ultimate design wind speed, V_{ult} < 150 mph at greater than 1 mile (1.6 km) from the coastline. The coastline shall be measured from the mean high-water mark.~~

~~6.2.2.3 Wind Zone 3-150 mph (67 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 170 mph (76 m/s), or 140 mph (54 m/s) ≤ ultimate design wind speed, V_{ult} ≤ 170 mph (76 m/s) and within 1 mile (1.6 km) of the coastline. The coastline shall be measured from the mean high-water mark~~.

~~6.2.2.4 Wind Zone 4-ultimate design wind speed, V_{ult} > 170 mph (76 m/s).~~

Reason: This proposal removes the technical criteria that is redundant with the current reference standards ASTM E1996-20 and ASCE7-22. ASTM E1996 has changed to ultimate design from strength design and reduced the wind zones from 4 to 3. The 'correction' as specified in IBC Section 1609.2.2 and IRC Section R301.2.1.2.1 is no longer needed with the current ASTM E1996-20 and ASCE 7-22. ASCE 7-10 changed the basis of its wind speed maps from allowable stress-level wind speeds to strength design-level wind speeds. However, due to the timing of the ICC code development cycle leading to the 2012 IBC and IRC and of the ASTM cycle for updating E1996, there was not enough time to correlate and update the wind speeds associated with the E1996 wind zones. Section 1609.2.2 was introduced as a temporary measure to correlate the E1996 wind zones with ASCE 7-10.

In addition, Wind Zone 4 was modified to trigger at a higher wind speed as was specified in E1996 at the time. Wind Zone 4 was originally introduced to bring Miami-Dade County on board with accepting ASTM E1996 as equivalent to the TAS 102. The IBC and IRC raised the Wind Zone 4 trigger as the ASCE 7-10 wind maps would have otherwise resulted in Wind Zone 4 extending beyond Miami-Dade County.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Removing the IBC and IRC modification will not change any design or testing requirements as the wind zone definitions in E1996 largely match those in the modification. It may reduce confusion in southern Florida by removing reference to Wind Zone 4, which no longer exists in E1996.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Reason: The proposal removed redundant text that is no longer needed in the code. (Vote: 10-0)

Final Hearing Results

S119-22 Part II	AS

S121-22

Original Proposal

IBC: SECTION 1609, 1609.5.3, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1609
WIND LOADS

Revise as follows:

1609.5.3 Rigid tile. Wind *loads* on rigid tile *roof coverings* shall be determined in accordance with the following equation:

$$M_a = q_h \underline{K_d} C_L b L L_a [1.0 - \underline{(} GC_p \underline{)}]$$ **(Equation 16-18)**

For SI:

$$M_a = q_h \underline{K_d} C_L b L L_a [1.0 - \underline{(} GC_p \underline{)}] / 1{,}000$$

where:

b = Exposed width, feet (mm) of the roof tile.

C_L = Lift coefficient. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1504.3.1.

$\underline{(} GC_p \underline{)}$ = Roof pressure coefficient for each applicable roof zone determined from Chapter 30 of ASCE 7. Roof coefficients shall not be adjusted for internal pressure.

<u>K_d = Wind directionality factor determined from Chapter 26 of ASCE 7</u>.

L = Length, feet (mm) of the roof tile.

L_a = Moment arm, feet (mm) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76L from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck application or as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.

M_a = Aerodynamic uplift moment, feet-pounds (N-mm) acting to raise the tail of the tile.

q_h = Wind velocity pressure, psf (kN/m^2) determined from Section 26.10.2 of ASCE 7.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the aerodynamic uplift moment as determined by this section.

1. The roof tiles shall be either loose laid on battens, mechanically fastened, *mortar* set or adhesive set.
2. The roof tiles shall be installed on solid sheathing that has been designed as components and cladding.
3. An *underlayment* shall be installed in accordance with Chapter 15.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than 2 inches (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 mm and 533 mm).
6. The exposed width of the tile shall be between 0.67 and 1.25 feet (204 mm and 381 mm).

7. The maximum thickness of the tail of the tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using *mortar* set or adhesive set systems shall have not less than two-thirds of the tile's area free of *mortar* or adhesive contact.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

<u>7-22</u> <u>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</u>

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
A summary of the coordination changes is provided below.

1609.5.3 Rigid tile. This code change is needed because the Wind Directionality Factor (K_d) in ASCE 7 - 22 Standard *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* was relocated from the Velocity Pressure Equation that determines q_h to the pressure equations that determine pressures on the components and cladding elements of the structure. Because K_d is no longer included in the calculation for q_h directly, it is added here. This is not a new addition for M_a equation, but only re-organization of the terms in the calculation. The parentheses are added around (*GCp*) to match with the formatting of the term in ASCE 7.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only coordinates the re-organization of the terms in the ASCE 7-22 equations for calculating the loads on rigid tiles. It does not change the values and therefore will have no effect on the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1609.5.3 Rigid tile. ~~Wind *loads*~~ <u>The aerodynamic uplift moment for</u> ~~on~~ rigid tile *roof coverings* shall be determined in accordance with the following equation:

$M_a = q_h K_d C_L b L L_a [1.0 - (GC_p)]$ **(Equation 16-18**

For SI:

$M_a = q_h K_d C_L b L L_a [1.0 - (GC_p)] / 1{,}000$

where:

b = Exposed width, feet (mm) of the roof tile.

C_L = Lift coefficient. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1504.3.1.

(GC_p) = Roof pressure coefficient for each applicable roof zone determined from Chapter 30 of ASCE 7. Roof coefficients shall not be adjusted for internal pressure.

K_d = Wind directionality factor determined from Chapter 26 of ASCE 7.

L = Length, feet (mm) of the roof tile.

L_a = Moment arm, feet (mm) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76L from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck application or as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.

M_a = Aerodynamic uplift moment, feet-pounds (N-mm) acting to raise the tail of the tile.

q_h = Wind velocity pressure, psf (kN/m^2) determined from Section 26.10.2 of ASCE 7.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the aerodynamic uplift moment as determined by this section.

1. The roof tiles shall be either loose laid on battens, mechanically fastened,*mortar* set or adhesive set.
2. The roof tiles shall be installed on solid sheathing that has been designed as components and cladding.
3. An *underlayment* shall be installed in accordance with Chapter 15.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than 2 inches (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 mm and 533 mm).
6. The exposed width of the tile shall be between 0.67 and 1.25 feet (204 mm and 381 mm).
7. The maximum thickness of the tail of the tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using *mortar* set or adhesive set systems shall have not less than two-thirds of the tile's area free of*mortar* or adhesive contact.

Committee Reason: Approved as modified to coordinate wind loads on rigid tile roof coverings with ASCE 7-22. The modification provides clarification of the term used in the section 1609.5.3. (Vote: 14-0)

Final Hearing Results

S121-22	AM

S122-22

Original Proposal

IBC: 1609.6 (New), 1612.2, 1613.4 (New), 3001.3, 3001.6 (New)

Proponents: Julie Furr, FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); Emily Guglielmo, NCSEA Wind Committee (eguglielmo@martinmartin.com); Kevin Brinkman, National Elevator Industry, Inc. (klbrinkman@neii.org); Robert Bachman, Robert Bachman Consulting Structural Engineer, FEMA/ATC Seismic Code Support Committee (rebachmanse@aol.com)

2021 International Building Code

Add new text as follows:

1609.6 Elevators, Escalators, and other Conveying Systems. Elevators, escalators, and other conveying systems and their components exposed to outdoor environments shall satisfy the wind design requirements of ASCE 7.

Revise as follows:

1612.2 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24. Elevators, escalators, conveying systems and their components shall conform to ASCE 24 and ASME A17.1/CSA B44 as applicable.

Add new text as follows:

1613.4 Elevators, Escalators, and other Conveying Systems. Elevators, escalators, and other conveying systems and their components shall satisfy the seismic requirements of ASCE 7 and ASME A17.1/CSA B44 as applicable.

Revise as follows:

3001.3 Referenced standards. ~~Except as otherwise provided for in this code,~~ tThe design, construction, installation, alteration, repair and maintenance of elevators and conveying systems and their components shall conform to the applicable standard specified in Table 3001.3 and Section 3001.6. ~~ASCE 24 for construction in *flood hazard areas* established in Section 1612.3~~.

Add new text as follows:

3001.6 Structural Design. All interior and exterior elevators, escalators, and other conveying systems and their components shall comply with all applicable design loading criteria in Chapter 16, including wind, flood, and seismic loads established in Sections 1609, 1612, and 1613.

Reason: The proposed revisions to Chapter 30 are intended to clarify which design criteria and standards apply to elevators, escalators, conveying systems and their components and that the provisions are applicable to both interior and exterior systems. Additionally, since applicable standards are published by different organizations subject to different update cycles, this specifies that the provisions of all applicable standards shall apply to ensure the absence of a provision in one standard is not used to avoid the provision entirely. These revisions do not impose new technical requirements on the structural design of these systems.
Environmental provisions, both interior and exterior, are relevant to the design and construction of elevators, escalators, and conveying systems. However, Section 3001.3 currently points only to ASME, ALI, ANSI and ASCE 24 (flood provisions) standards, without reference to ASCE 7. The omission of ASCE 7 leaves Chapter 30 open to an interpretation that ASCE 7 does not apply or is overridden by the listed standards.

Wind

There have been many cases in south Florida where high wind loads were not considered in the design and installation of outdoors escalators and elevators. ASME A17.1 does not currently address wind provisions, leaving ASCE 7 as the next appropriate standard to reference. However, since ASCE 7 is not specified in Chapter 30, a common interpretation is that only ASME A17.1 should apply and ASCE 7 is not required. This leaves exterior structures vulnerable to damage and/or failure when exposed to high winds.

Seismic

ASME A17.1 and ASCE 7 both outline seismic requirements for elevators and conveying systems, but different update cycles mean these two standards are not always in sync. As such, seismic provisions in the current version of ASME A17.1 are based on ASCE 7-16 and still need to be updated to comply with changes in ASCE 7-22. There are significant differences in the requirements of ASCE 7-22 and ASCE 7-16 that the casual user may be unaware of. It is unknown if ASME A17.1 will be updated in time for incorporation into the 2024 IBC.

For individual structures, this proposal may reduce the nonstructural component seismic design forces constructed using lateral force-resisting system with higher ductility, which are commonly used in regions of high seismic risk while for structures using low or moderate ductility systems the seismic design forces may increase.

Flood

Reference to ASCE 24 specifically for elevators, escalators and conveying systems has been relocated to Section 1612. ASME A17.1 Section 8.12 specifically states that elevators must be in compliance with ASCE 24.

Other

Snow, ice, and other environmental loads are equally important to maintain structural stability and should be considered in design for exterior systems, where applicable. The general reference to Chapter 16 captures all other environmental loading conditions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification that more clearly defines when ASCE and ASME standards are required for different environmental loads and conditions. The added language in Chapter 16 further clarifies that a lack of reference to specific environmental loads in one standard does not mean the design is exempt from considering that environmental load.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately addresses the load requirements for elevators, escalators and other conveying systems. (Vote:14-0)

Final Hearing Results

S122-22 AS

S123-22

Original Proposal

IBC: SECTION 1610, 1610.1, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1610
SOIL LOADS AND HYDROSTATIC PRESSURE

Revise as follows:

1610.1 Lateral pressures. ~~Foundation walls and retaining walls~~ Structures below grade shall be designed to resist lateral soil *loads* from adjacent soil. Soil *loads* specified in Table 1610.1 shall be used as the minimum design lateral soil *loads* unless determined otherwise by a geotechnical investigation in accordance with Section 1803. Foundation walls and other walls in which horizontal movement is restricted at the top shall be designed for at-rest pressure. ~~Retaining walls~~ Walls that are free to move and rotate at the top, such as retaining walls, shall be permitted to be designed for active pressure.

Where applicable, lateral ~~Lateral~~ pressure from fixed or moving surcharge *loads* shall be added to the lateral soil *load*. Lateral pressure shall be increased if expansive soils are present at the site. Foundation walls shall be designed to support the weight of the full hydrostatic pressure of undrained backfill unless a drainage system is installed in accordance with Sections 1805.4.2 and 1805.4.3.

Exception: Foundation walls extending not more than 8 feet (2438 mm) below grade and laterally supported at the top by flexible *diaphragms* shall be permitted to be designed for active pressure.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal makes minor changes to coordinate with the 2022 edition of ASCE 7. The revised text is more clear and does not limit the use of the lateral soil loads to just foundation walls and retaining walls. The loads can be applied to all below grade structures as limited within the section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The lateral soil loads are unchanged.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted to coordinate with ASCE 7-22 for lateral earth pressures. (Vote: 13-0)

Final Hearing Results

S123-22	AS

S124-22

Original Proposal

IBC: SECTION 1603, 1603.1.9, SECTION 1611, 1611.1, FIGURE 1611.1(1), FIGURE 1611.1(2), FIGURE 1611.1(3), FIGURE 1611.1(4), FIGURE 1611.1(5), 1611.2, 1611.3, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

SECTION 1603
CONSTRUCTION DOCUMENTS

Revise as follows:

1603.1.9 Roof rain load data. Design rainfall ~~Rain~~ intensity, *i* (in/hr) (cm/hr), shall be shown regardless of whether rain *loads* govern the design.

SECTION 1611
RAIN LOADS

Revise as follows:

1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the *load* of rainwater as per the requirements of Chapter 8 of ASCE 7. Rain loads shall be based on the summation of the static head, d_s, hydraulic head, d_h, and ponding head, d_p, using Eqn. 16-19. The hydraulic head shall be based on hydraulic test data or hydraulic calculations assuming a flow rate corresponding to a rainfall intensity equal to or greater than the 15-min duration storm with return period given in Table 1611.1. Rainfall intensity shall be determined in inches per hour for 15 minute duration storms for Risk Category given in Table 1611.1. ~~The design rainfall shall be based on the 100-year 15-minute duration event, or on other rainfall rates determined from approved local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figures 1611.1(1) through 1611.1(5) shall be permitted.~~ The ponding head shall be based on structural analysis as the depth of water due to deflections of the roof subjected to unfactored rain load and unfactored dead load.

$R = 5.2 (d_s + d_h + d_p)$ **(Equation 16-19)**

For SI: $R = 0.0098(d_s + d_h + d_p)$

where:

d_h = hydraulic head equal to the depth of water on the undeflected roof above the inlet of the secondary drainage system for structural loading (SDSL) required to achieve the design flow in in. (mm)~~Additional depth of water on the undeflected roof above the inlet of secondary drainage system at its design flow (in other words, the hydraulic head), in inches (mm).~~

d_s = static head equal to the depth of water on the undeflected roof up to the inlet of the secondary drainage system for structural loading (SDSL) in in. (mm) ~~Depth of water on the undeflected roof up to the inlet of secondary drainage system when the primary drainage system is blocked (in other words, the static head), in inches (mm).~~

d_p = ponding head equal to the depth of water due to deflections of the roof subjected to unfactored rain load and unfactored dead load, in in. (mm)*R* = Rain load ~~on the undeflected roof~~, in psf (kN/m^2). ~~Where the phrase "undeflected roof" is used, deflections from *loads* (including *dead loads*) shall not be considered when determining the amount of rain on the roof~~.

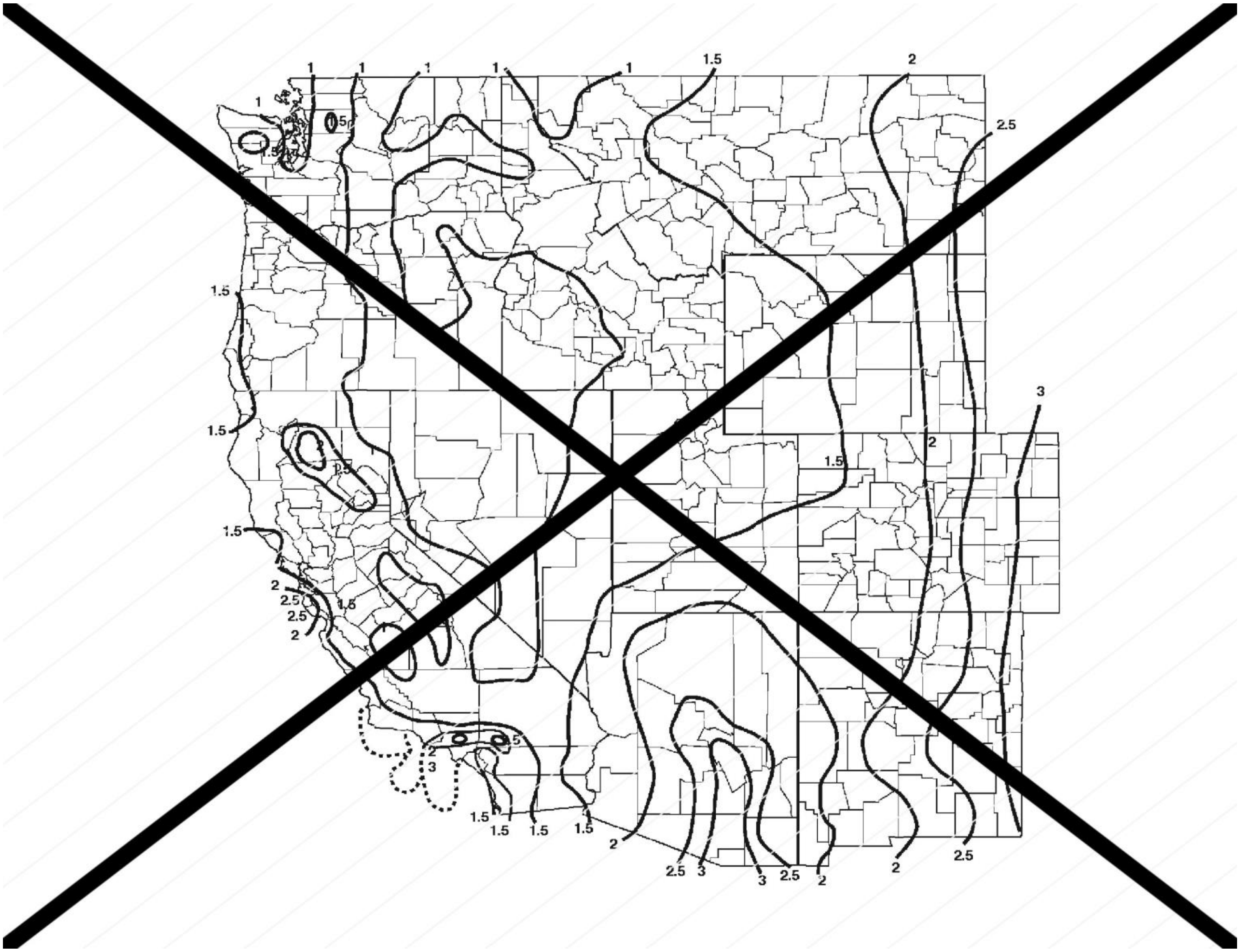
SDSL is the roof drainage system through which water is drained from the roof when the drainage systems listed in ASCE 7 Section 8.2 (a) through (d) are blocked or not working.

Table 1611.1 Design Storm Return Period by Risk Category

Risk Category	Design Storm Return Period

I & II	100 Years
III	200 Years
IV	500 Years

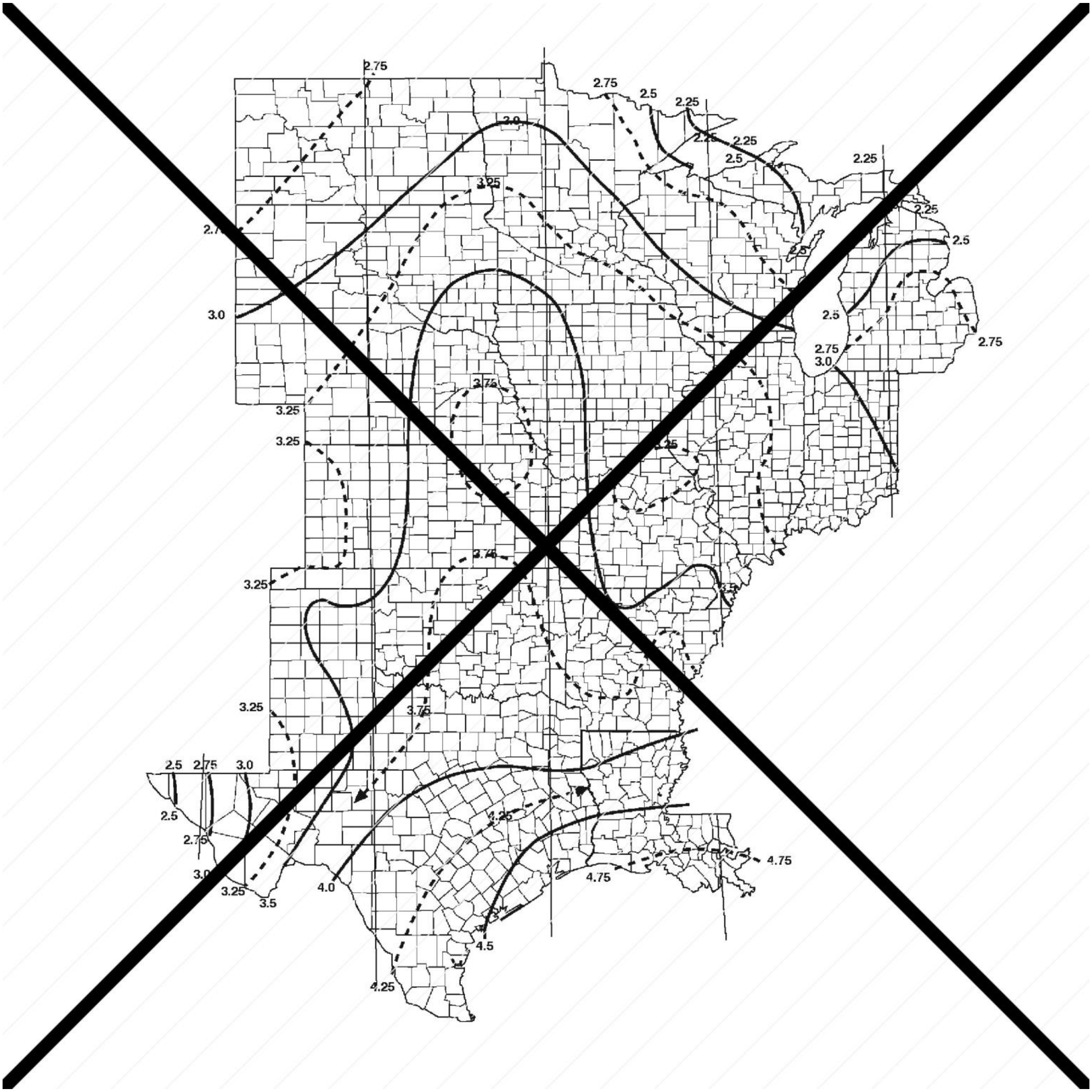
Delete without substitution:



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

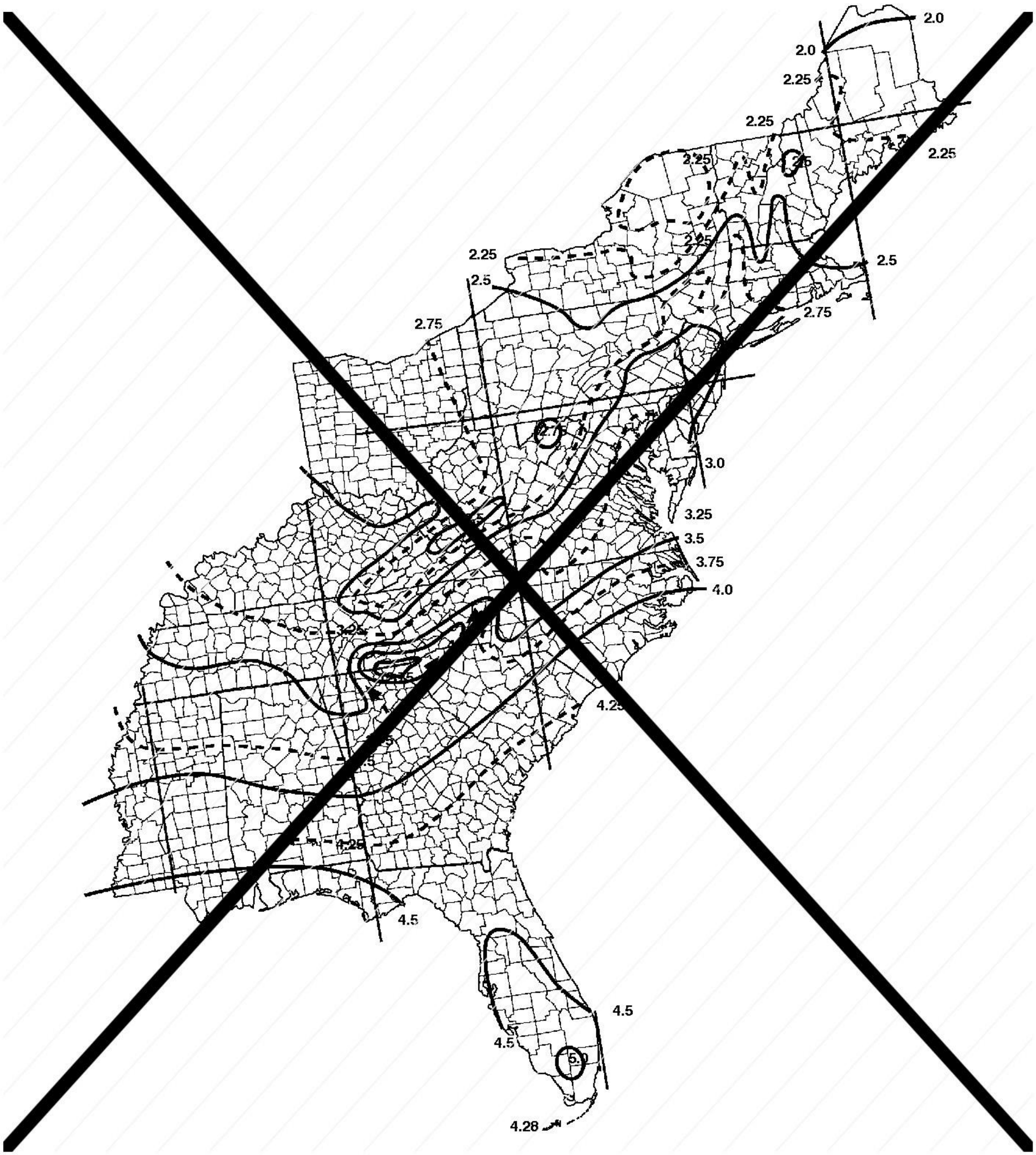
~~**FIGURE 1611.1(1) 100-YEAR, 1-HOUR RAINFALL (INCHES) WESTERN UNITED STATES**~~



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

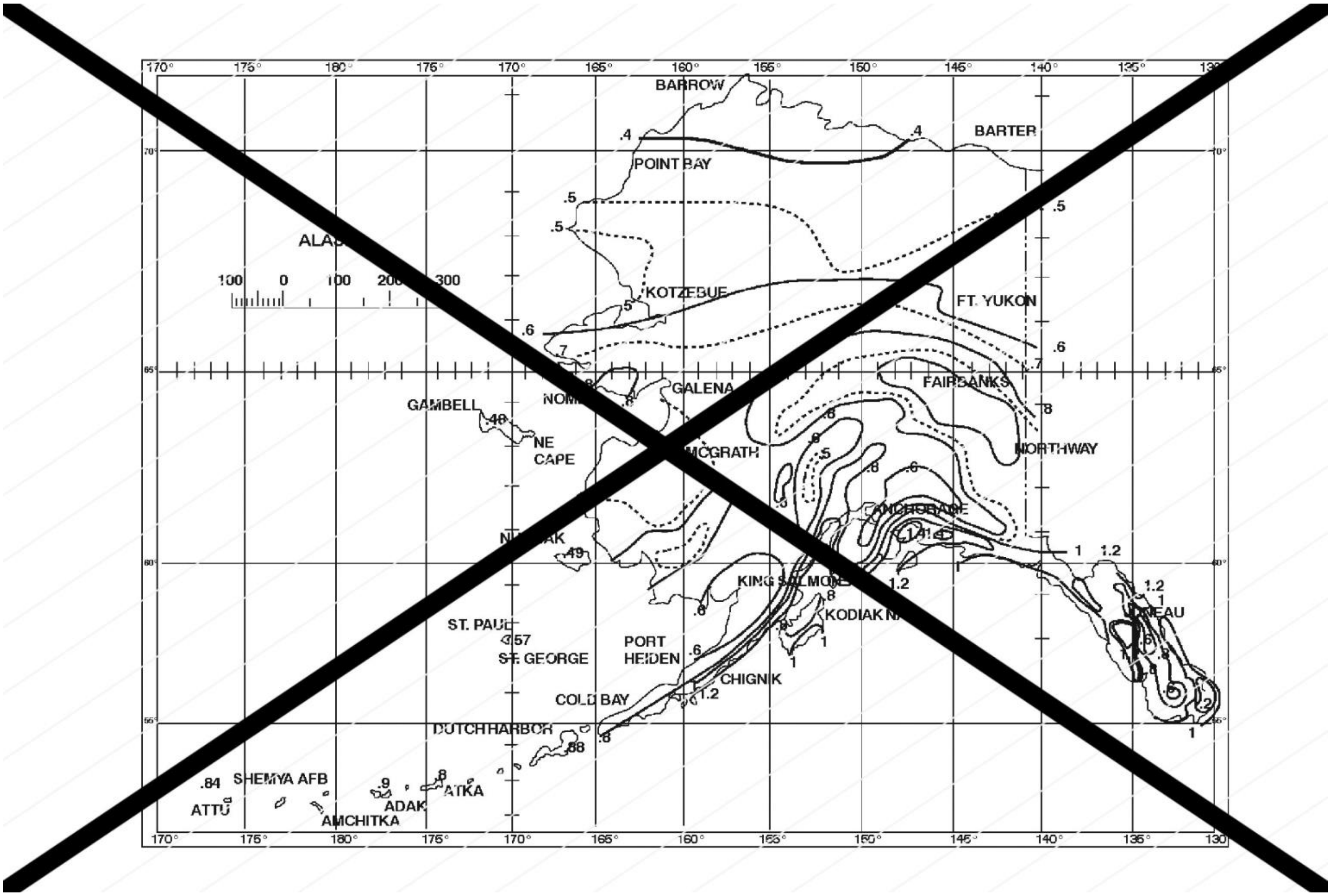
~~FIGURE 1611.1(2) 100-YEAR, 1-HOUR RAINFALL (INCHES) CENTRAL UNITED STATES~~



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

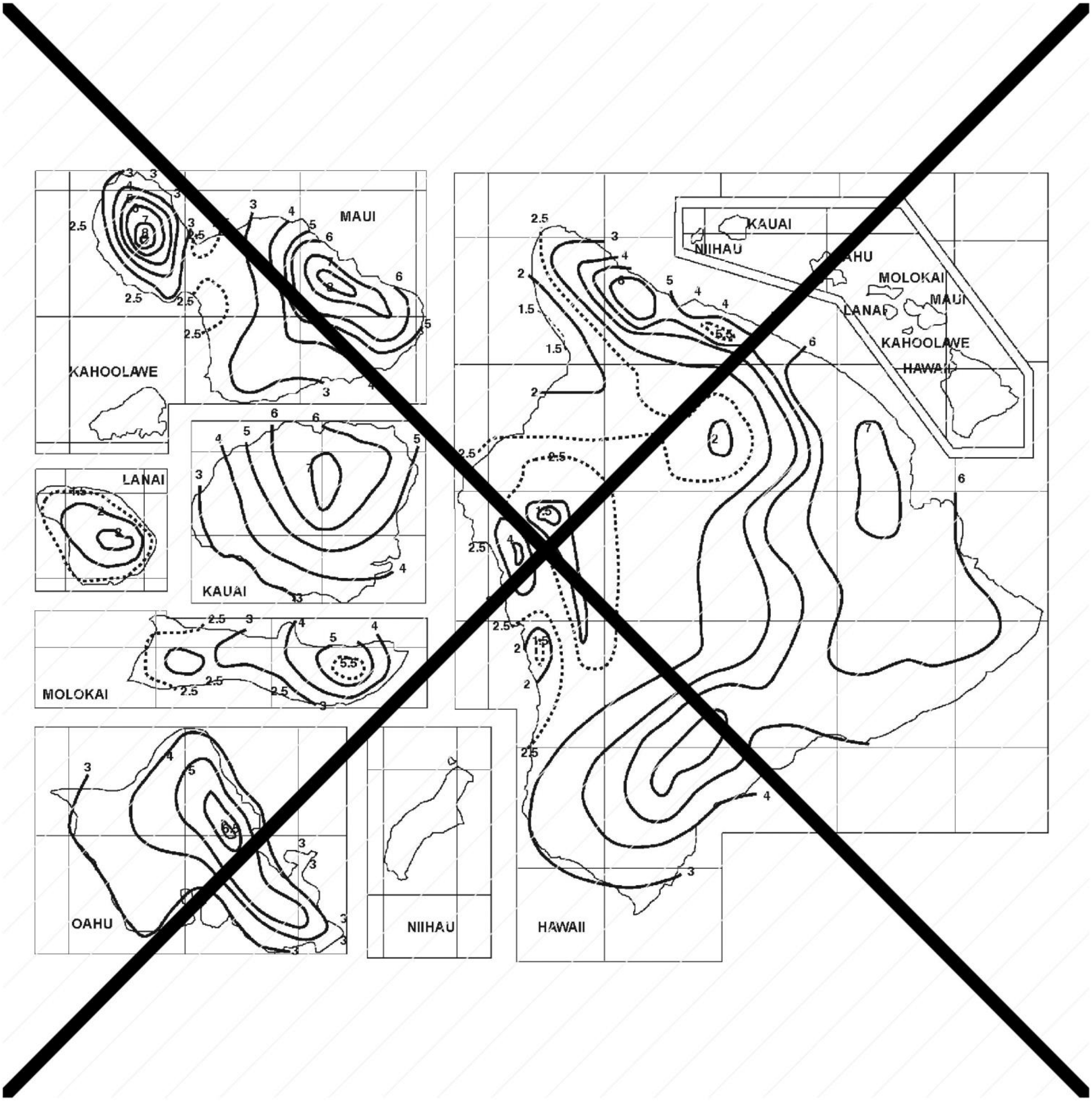
~~**FIGURE 1611.1(3) 100-YEAR, 1-HOUR RAINFALL (INCHES) EASTERN UNITED STATES**~~



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

~~**FIGURE 1611.1(4) 100-YEAR, 1-HOUR RAINFALL (INCHES) ALASKA**~~



~~For SI: 1 inch = 25.4 mm.~~

~~Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington, DC.~~

~~FIGURE 1611.1(5) 100-YEAR, 1-HOUR RAINFALL (INCHES) HAWAII~~

1611.2 Ponding instability. *Susceptible bays* of roofs shall be evaluated for ponding instability in accordance with Chapters 7 and 8 of ASCE 7.

1611.3 Controlled drainage. Roofs equipped with hardware to control the rate of drainage shall be equipped with a secondary drainage system at a higher elevation that limits accumulation of water on the roof above that elevation. Such roofs shall be designed to sustain the *load* of rainwater that will accumulate on them to the elevation of the secondary drainage system plus the uniform*load* caused by water that rises above the inlet of the secondary drainage system at its design flow determined from Section 1611.1. Such roofs shall be checked for ponding instability in accordance with Section 1611.2.

Add new standard(s) as follows:

ASCE/SEI American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

<u>7-22</u> <u>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</u>

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal includes technical updates as well as editorial corrections or re-organizations.

A summary of the coordination changes made to each section is as follows.

Section 1611.1 Design rain loads. The primary change is the addition of the ponding head (d_p) directly into the rain load calculation. In ASCE 7-16 and previous editions, there was a requirement to perform a ponding analysis, yet limited guidance was provided on how to perform that analysis. The commentary references the methods in Appendix 2 of the AISC Specification (AISC 360), however these provisions are of limited scope and they are currently under ballot to be removed from the AISC Specification. The addition of the ponding head to rain load provides a more consistent approach to accommodate ponding. The addition SDSL pointer to ensure that the requirement that the inlet to the SDSL be vertically separated from the inlet to the primary drainage system by not less than 2 in. This requirement will allow activation of the SDSL to serve as a warning that the primary drainage system is blocked.

Table 1611.1 Design Storm Return Period by Risk Category- ASCE 7-22 incorporates risk category into the determination of rainfall intensity. Therefore, this change to design storm return period for determination of hydraulic head to be based on risk category. **Figures 1611.1(1) through 1611.1(5).** These figures were removed because they are outdated. Theses are 100-year hourly rainfall maps, which do not adequately provide the rainfall intensity required by a 15 minute storm. Furthermore, the rainfall is now required to be determined based upon risk category. ASCE 7 does not provide rainfall data or maps for determining the rainfall rate. The best source currently is the National Oceanic and Atmospheric Administration (NOAA's) National Weather Service Precipitation Frequency Data Server - Hydrometerorological Design Studies Center for precipitation intensity (inches per hour) based on the required mean recurrence interval (years).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not add load or increase costs. It is a change to how the load is calculated to align with ASCE 7-22. Past editions of ASCE 7 have included the requirement that ponding be considered in structural designs. This proposal formalizes aspects of the method in which the engineer must consider ponding, most notably by including the effects of ponding in the rain load. While rain load will increase because of this proposal, the effect on overall demands and construction cost is less clear since separate ponding investigation requirements have been removed. The impact on construction cost will largely be dependent on the methods previously used by individual engineers to perform their ponding investigation.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1603.1.9 Roof rain load data. Design rainfall intensity, *i* (in/hr) (cm/hr), <u>and roof drain, scupper and overflow locations</u> shall be shown regardless of whether rain *loads* govern the design.

Committee Reason: Approved as modified to bring the code update to date with rain loads consistent with ASCE 7-22. The modification adds language to improve the clarity of the section 1603.1.9. (Vote: 14-0)

Final Hearing Results

S124-22	AM

S125-22 Part I

Original Proposal

IBC: [A] 110.3.12.1, 1612.4

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE ADMIN CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 110.3.12.1 Flood hazard documentation. If located in a *flood hazard area*, documentation of the elevation of the *lowest floor* <u>or the elevation of dry floodproofing, if applicable,</u> as required in Section 1612.4 shall be submitted to the *building official* prior to the final inspection.

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* other than *coastal high hazard areas* or *coastal A zones*:
   1.1. The elevation of the *lowest floor*, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.

   1.2. For fully enclosed areas below the *design flood elevation* where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, *construction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

   1.3. For *dry floodproofed* nonresidential buildings, *construction documents* shall include a statement that the *dry floodproofing* is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.

   1.4. <u>For dry floodproofed nonresidential buildings, the elevation to which the building is dry floodproofed as required for the final inspection in Section 110.3.12.1.</u>

2. For construction in *coastal high hazard areas* and *coastal A zones*:
   2.1. The elevation of the bottom of the lowest horizontal structural member as required by the *lowest floor* elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.

   2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and *flood loads* acting simultaneously on all building components, and other *load* requirements of Chapter 16.

   2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using *allowable stress design*, *construction documents* shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

   2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

Reason: When nonresidential buildings in flood hazard areas are proposed to be dry floodproofed, several aspects of design are critical, including the strength of walls and flood shields that are designed to be watertight (addressed in 1612.4 #1.3) and the required elevation

of the dry floodproofing, which is specified in ASCE 24 Chapter 6.
The proposed change follows the pattern already established for documentation of lowest floor elevations prior to the final inspection. Because dry floodproofed buildings do not have elevated "lowest floors," rather than survey floors, this change clarifies the elevation to which dry floodproofed buildings are protected is to be documented. Having this elevation determined and documented helps local officials confirm compliance with the design requirements. The NFIP regulations require communities to obtain the elevation to which structures are floodproofed [44 Code of Federal Regulations Sec. 60.3(b)(5)(ii)].

FEMA's Mitigation Assessment Team reports prepared after some significant flood events document failures of dry floodproofing systems. Some failures are caused by floodwater rising higher than the protective measures, which indicates the value of documenting that construction of those measures does meet the requirements for compliance.

Many communities require permittees to use the FEMA Floodproofing Certificate for Non-Residential Structures (FEMA Form 086-0-34). That form is prepared for use to certify designs as part of documentation submitted with permit applications, as well as for use to certify the "floodproofed elevation." The form also is used when certification of as-built conditions is required, including the elevation to which the building is dry floodproofed. The FEMA National Flood Insurance Program requires as-built certification as part of qualifying for NFIP flood insurance policy coverage for dry floodproofed nonresidential buildings.

Bibliography: FEMA Form 086-0-34, FEMA Floodproofing Certificate for Non-Residential Structures:https://www.fema.gov/media-library/assets/documents/2748

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal clarifies that the elevation to which dry floodproofed buildings are protected is to be documented, rather than documentation of the "lowest floors." There is no change in cost because the cost to survey the elevation to which a building is dry floodproofed would be equal to the cost to survey a floor elevation relative to datum. Completion of the survey portion of the FEMA Nonresidential Floodproofing Certificate requires fewer inputs by the professional certifying the survey than are required to complete a FEMA Elevation Certificate.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adjusts the requirements for flood hazard documentation consistent with ASCE 24. (Vote: 14-0)

Final Hearing Results

S125-22 Part I AS

S125-22 Part II

Original Proposal

IEBC: [A] 109.3.10

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Existing Building Code

Revise as follows:

[A] 109.3.10 Flood hazard documentation. Where a building is located in a *flood hazard area*, documentation of the elevation of the lowest floor <u>or the elevation of dry floodproofing, if applicable,</u> as required in the International Building Code or the International Residential Code, as applicable, shall be submitted to the *code official* prior to the final inspection.

Reason: When nonresidential buildings in flood hazard areas are proposed to be dry floodproofed, several aspects of design are critical, including the strength of walls and flood shields that are designed to be watertight (addressed in 1612.4 #1.3) and the required elevation of the dry floodproofing, which is specified in ASCE 24 Chapter 6.
The proposed change follows the pattern already established for documentation of lowest floor elevations prior to the final inspection. Because dry floodproofed buildings do not have elevated “lowest floors,” rather than survey floors, this change clarifies the elevation to which dry floodproofed buildings are protected is to be documented. Having this elevation determined and documented helps local officials confirm compliance with the design requirements. The NFIP regulations require communities to obtain the elevation to which structures are floodproofed [44 Code of Federal Regulations Sec. 60.3(b)(5)(ii)].

FEMA’s Mitigation Assessment Team reports prepared after some significant flood events document failures of dry floodproofing systems. Some failures are caused by floodwater rising higher than the protective measures, which indicates the value of documenting that construction of those measures does meet the requirements for compliance.

Many communities require permittees to use the FEMA Floodproofing Certificate for Non-Residential Structures (FEMA Form 086-0-34). That form is prepared for use to certify designs as part of documentation submitted with permit applications, as well as for use to certify the “floodproofed elevation.” The form also is used when certification of as-built conditions is required, including the elevation to which the building is dry floodproofed. The FEMA National Flood Insurance Program requires as-built certification as part of qualifying for NFIP flood insurance policy coverage for dry floodproofed nonresidential buildings.

Bibliography: FEMA Form 086-0-34, FEMA Floodproofing Certificate for Non-Residential Structures:https://www.fema.gov/media-library/assets/documents/2748

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal clarifies that the elevation to which dry floodproofed buildings are protected is to be documented, rather than documentation of the “lowest floors.” There is no change in cost because the cost to survey the elevation to which a building is dry floodproofed would be equal to the cost to survey a floor elevation relative to datum. Completion of the survey portion of the FEMA Nonresidential Floodproofing Certificate requires fewer inputs by the professional certifying the survey than are required to complete a FEMA Elevation Certificate.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE ADMINISTRATIVE COMMITTEE.

Committee Reason: The committee stated that the reason for approval was that this language is absolutely needed in dry floodproofing cases where buildings are elevated to get this certification. (Vote: 13-0)

Final Hearing Results	
S125-22 Part II	AS

S126-22

Original Proposal

IBC: 1612.4

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

2021 International Building Code

Revise as follows:

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* other than *coastal high hazard areas* or *coastal A zones*:
   1.1. The elevation of the *lowest floor*, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.

   1.2. For fully enclosed areas below the *design flood elevation* where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, *construction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

   1.3. For *dry floodproofed* nonresidential buildings, *construction documents* shall include a statement that the *dry floodproofing* is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.

2. For construction in *coastal high hazard areas* and *coastal A zones*:
   2.1. The elevation of the bottom of the lowest horizontal structural member as required by the *lowest floor* elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.

   2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and *flood loads* acting simultaneously on all building components, and other *load* requirements of Chapter 16.

   2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using *allowable stress design* or a resistance to an ultimate load of more than 33 psf (1.58 kN/m^2), *construction documents* shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

   2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

Reason: This code change does not change the loads used to design breakaway walls. It just shows how the loads expressed using allowable stress design are expressed as ultimate loads, which is used in ASCE 7 for seismic design and wind loads. One of the reasons for the lower load shown in the existing section is to avoid breakaway walls that might fail under wind loads. Showing the loads expressed as ultimate loads will make it easier to compare to calculated wind loads and seismic loads.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal shows how the loads expressed using allowable stress design are expressed as ultimate loads to better align with ASCE 7. There is no change to the technical content of the provisions. By showing how existing load values are expressed as ultimate loads, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies the LRFD resistance requirements. (Vote: 14-0)

Final Hearing Results

S126-22	AS

S128-22

Original Proposal

IBC: 1613.1, 1613.2, 1613.2.1, FIGURE 1613.2.1(1), FIGURE 1613.2.1(2), FIGURE 1613.2.1(3), FIGURE 1613.2.1(5), FIGURE 1613.2.1(6), FIGURE 1613.2.1(7), FIGURE 1613.2.1(8), FIGURE 1613.2.1(9), FIGURE 1613.2.1(10), 1613.2.2, 1613.2.3, TABLE 1613.2.3(1), TABLE 1613.2.3(2), 1613.2.4, 1613.2.5, TABLE 1613.2.5(1), TABLE 1613.2.5(2), 1613.2.5.1, 1613.2.5.2, 1613.3, SECTION 202, 1810.3.9.4.2.1, 1603.1.5, J104.4, L101.1, ASCE/SEI Chapter 35 (New)

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); John Hooper, ATC/FEMA SCSC (jhooper@mka.com); Sanaz Rezaeian, USGS (srezaeian@usgs.gov); Nicolas Luco, U.S. Geological Survey

2021 International Building Code

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The *seismic design category* for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C. ~~, or located where the mapped short-period spectral response acceleration,~~ ~~S_S, is less than 0.4 g.~~
2. The *seismic force-resisting system* of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. References within ASCE 7 to Chapter 14 shall not apply, except as specifically required herein.

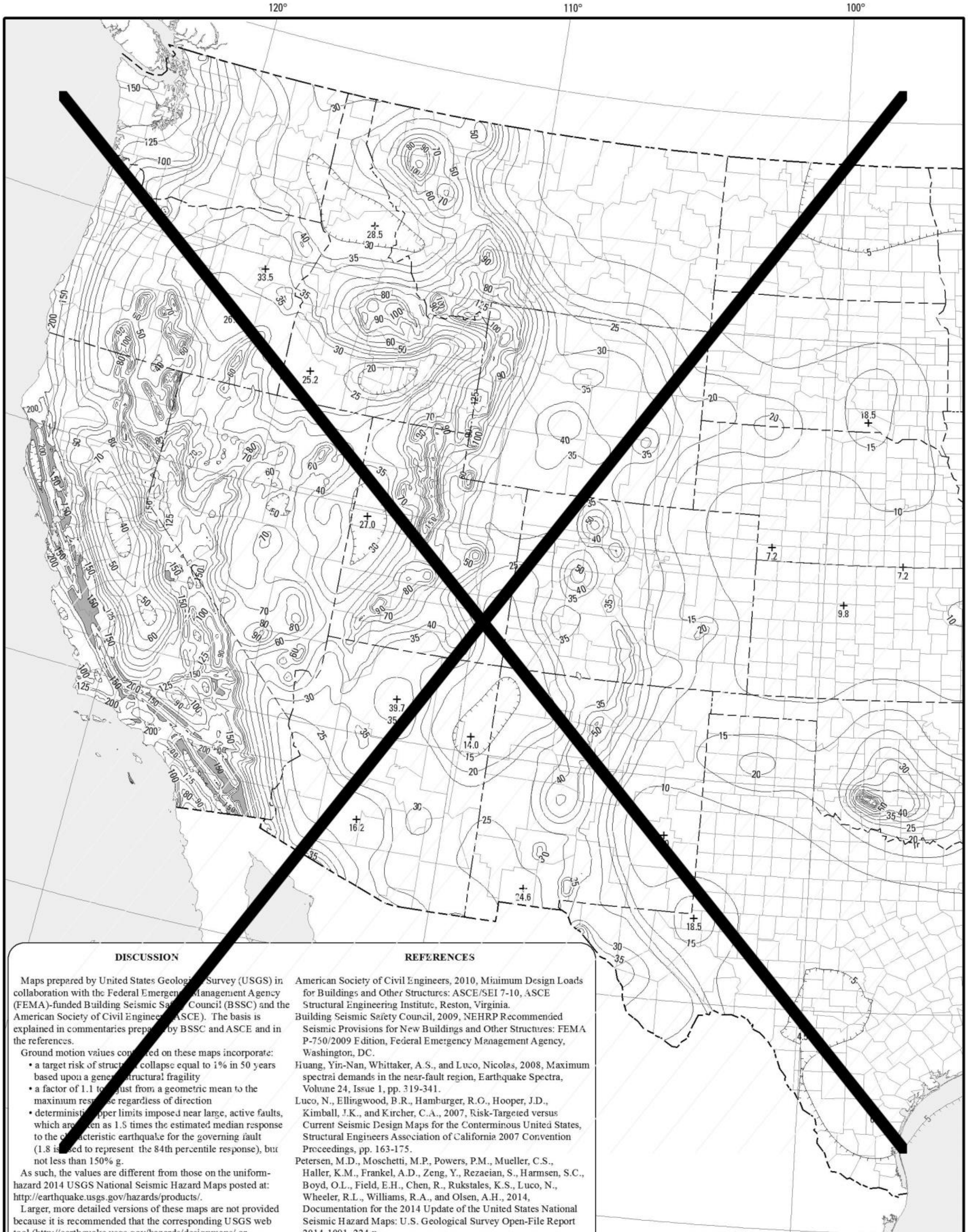
1613.2 Determination of *Seismic Design Category* ~~**Seismic ground motion values.**~~ Structures shall be assigned to a *Seismic Design Category* based on one of the following methods unless the authority having jurisdiction or geotechnical data determines that *Site Class* DE, E or F soils are present at the site. Where *Site Class* DE, E or F soils are present, the *Seismic Design Category* shall be determined in accordance with ASCE 7. Seismic ground motion values shall be determined in accordance with this section.

1. Using Figures 1613.2(1) through 1613.2(6) based on the structure *Risk Category*, or
2. Determined in accordance with ASCE 7.

Delete without substitution:

~~**1613.2.1 Mapped acceleration parameters.** The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.2.1(1) through 1613.2.1(10). Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned *Seismic Design Category* A.~~

Delete and substitute as follows:



DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- a factor of 1.1 to adjust from a geometric mean to the maximum response regardless of direction
- deterministic upper limits imposed near large, active faults, which are taken as 1.5 times the estimated median response to the characteristic earthquake for the governing fault (1.8 is used to represent the 84th percentile response), but not less than 150% g.

As such, the values are different from those on the uniform-hazard 2014 USGS National Seismic Hazard Maps posted at: http://earthquake.usgs.gov/hazards/products/.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/hazards/designmaps/ or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

American Society of Civil Engineers, 2010, Minimum Design Loads for Buildings and Other Structures: ASCE/SEI 7-10, ASCE Structural Engineering Institute, Reston, Virginia.

Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Luco, N., Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Y., Rezaeian, S., Harmsen, S.C., Boyd, O.L., Field, E.H., Chen, R., Rukstales, K.S., Luco, N., Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2014-1091, 224 p.

~~**FIGURE 1613.2.1(1) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF**~~

~~CRITICAL DAMPING)~~

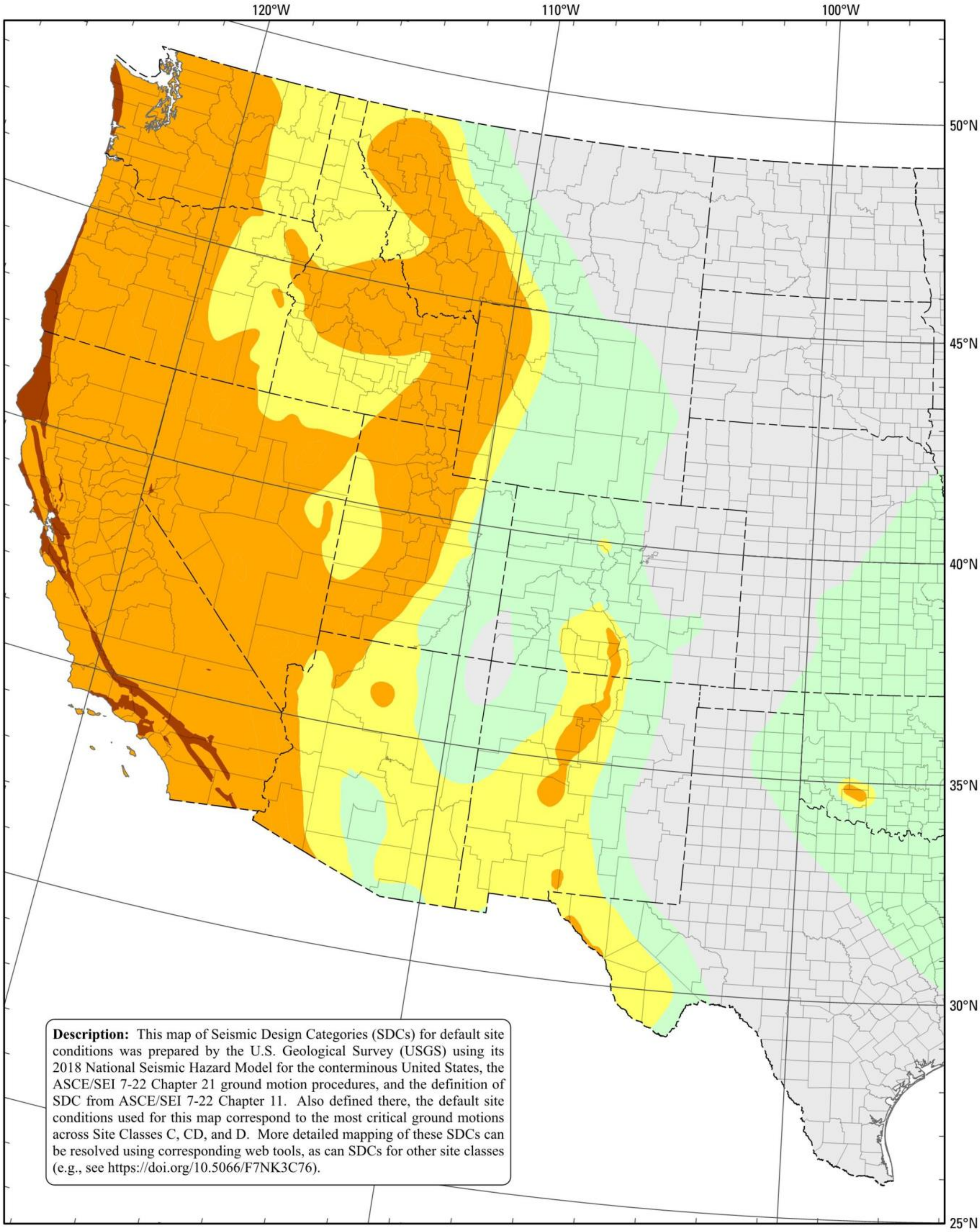


FIGURE 1613.2.1(1) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR THE CONTERMINOUS UNITED STATES

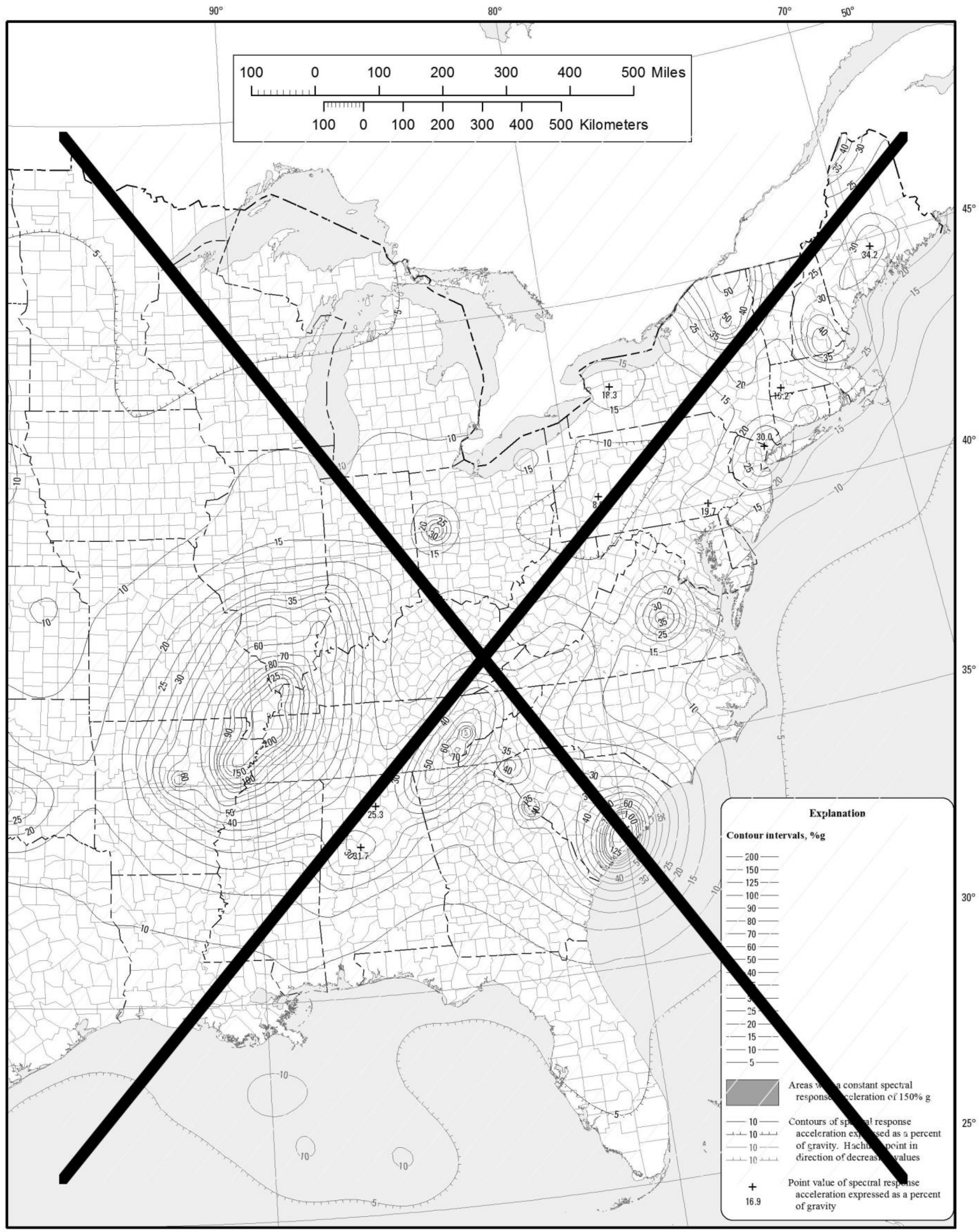


Figure 1613.3.1(1)-continued Risk-Targeted Maximum Considered Earthquake (MCE$_R$) Ground Motion for the Conterminous United States of 0.2-Second Spectral Response Acceleration (5% of Critical Damping)

~~**FIGURE 1613.2.1(2) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE$_R$) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF**~~

~~CRITICAL DAMPING)~~

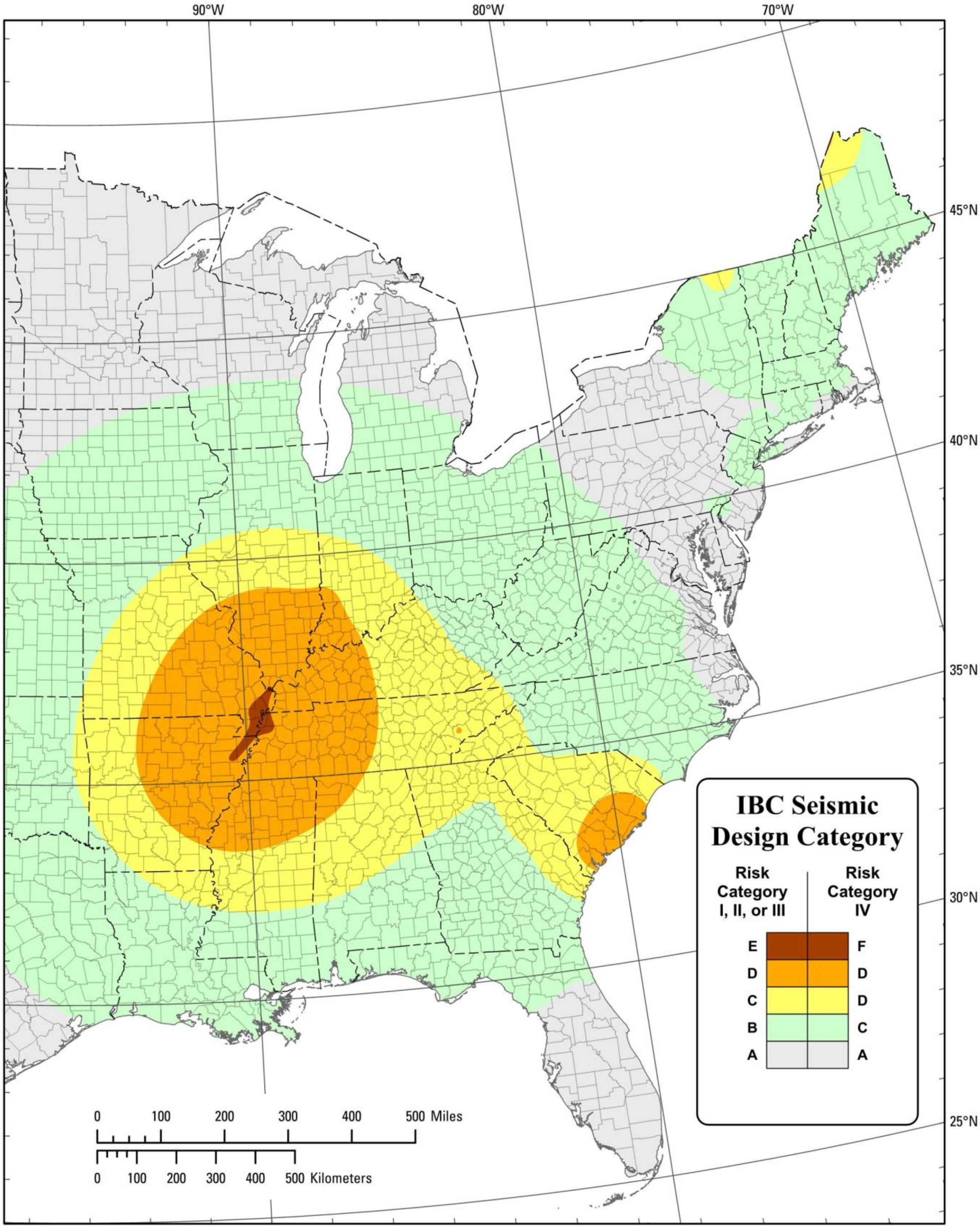
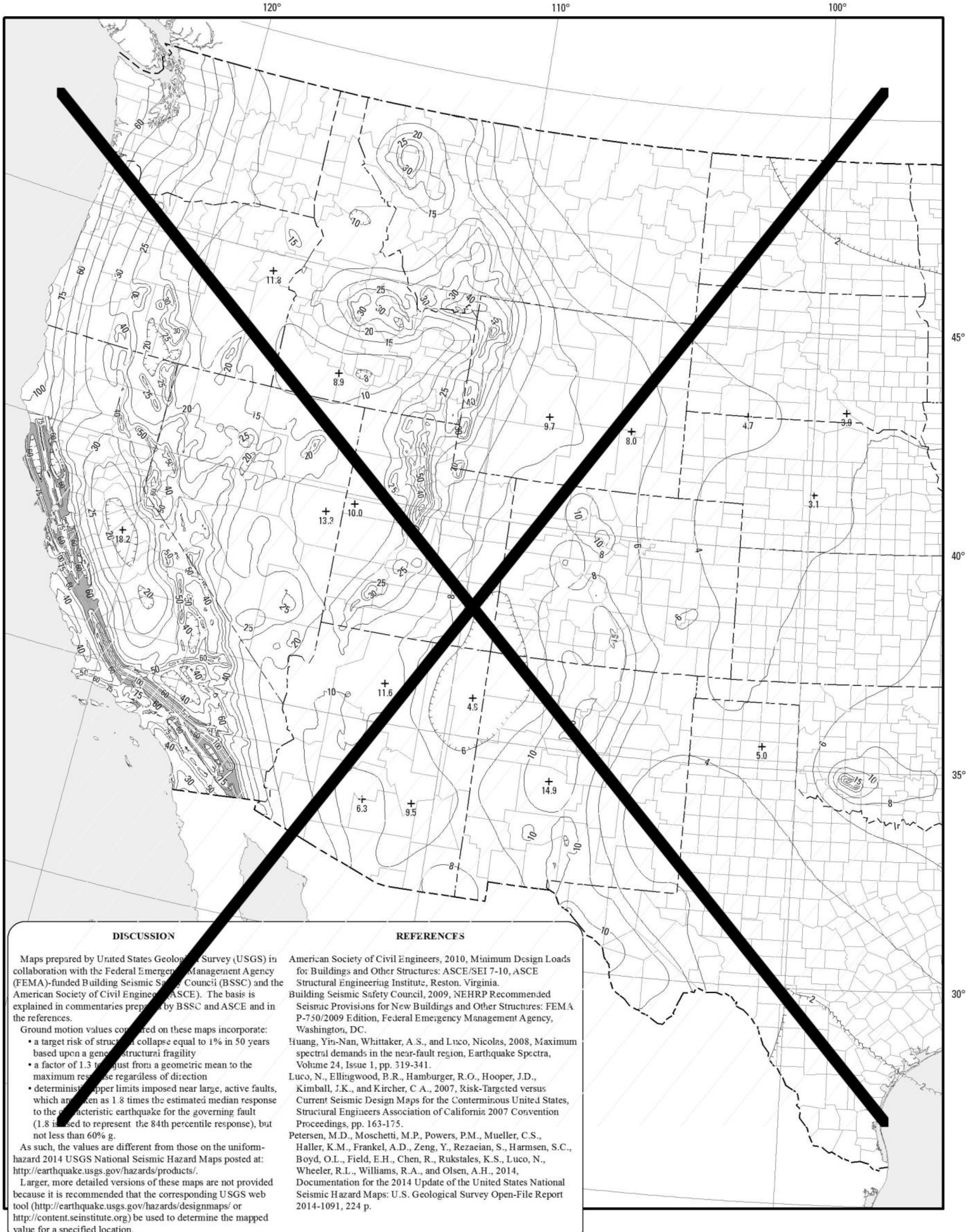


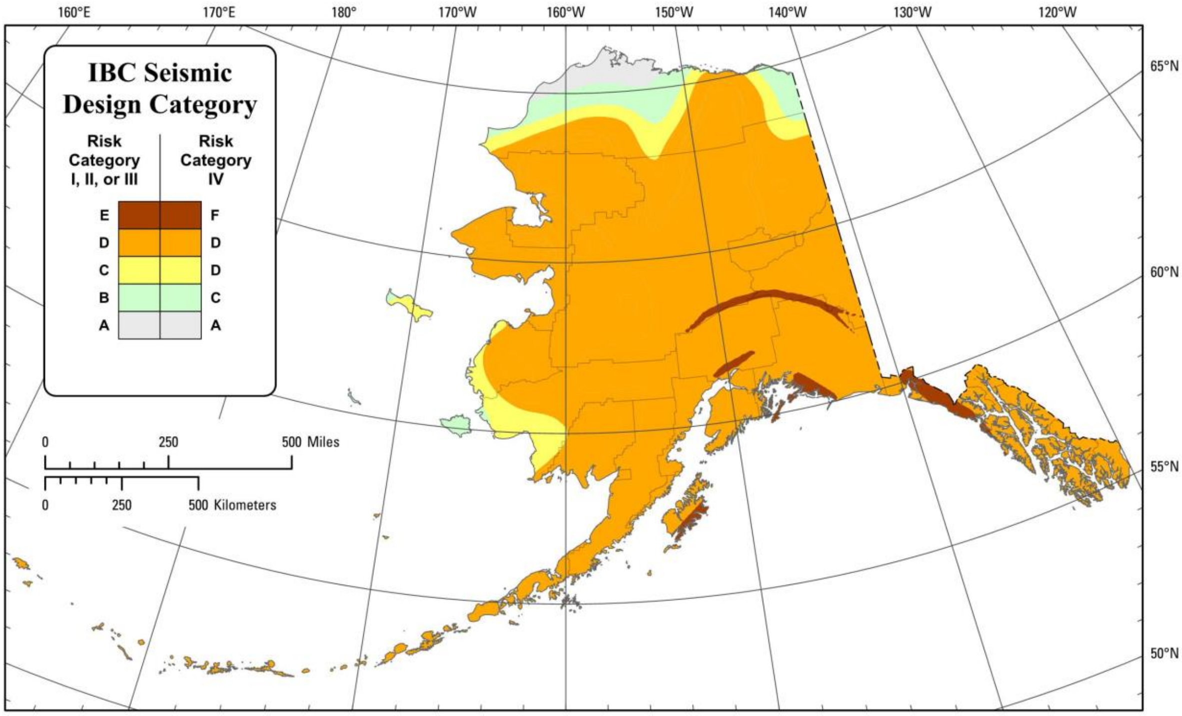
FIGURE 1613.2.1(1) CONTINUED

SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR THE CONTERMINOUS UNITED STATES



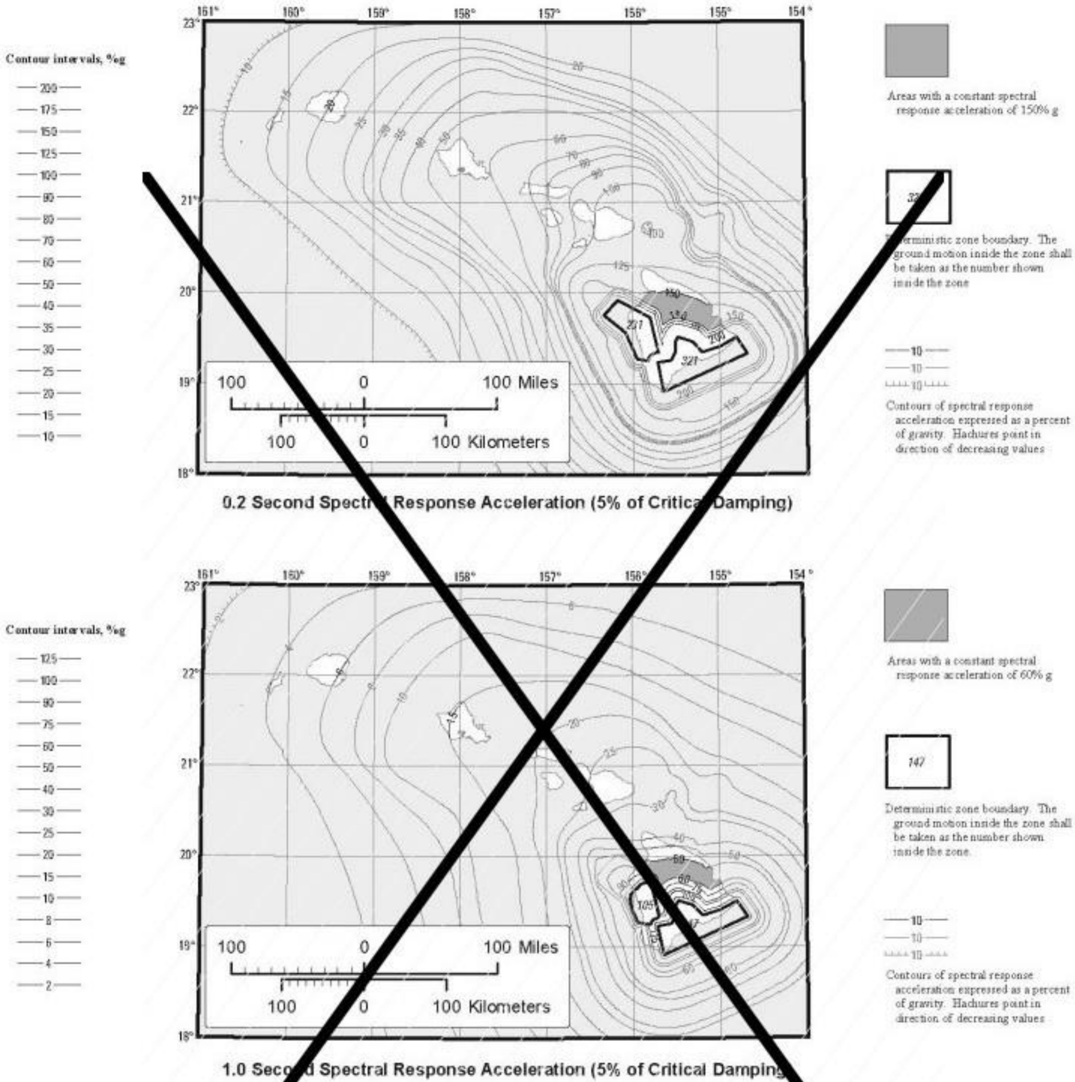
~~FIGURE 1613.2.1(3) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF~~

~~CRITICAL DAMPING)~~



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2007 National Seismic Hazard Model for Alaska, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools, as can SDCs for other site classes (e.g., see https://doi.org/10.5066/F7NK3C76).

FIGURE 1613.2.1(2)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR ALASKA



DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 sec, respectively.

As such, the values are different from those on the uniform-hazard 1998 USGS National Seismic Hazard Maps for Hawaii posted at http://earthquake.usgs.gov/hazmaps.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/designmaps or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Klein, F., Frankel, A.D., Mueller, C.S., Wesson, R.L., and Okubo, P., 2001, Seismic hazard in Hawaii: high rate of large earthquakes and probabilistic ground-motion maps, Bulletin of the Seismological Society of America, Volume 91, pp. 479-498.

Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

~~**FIGURE 1613.2.1(5) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~

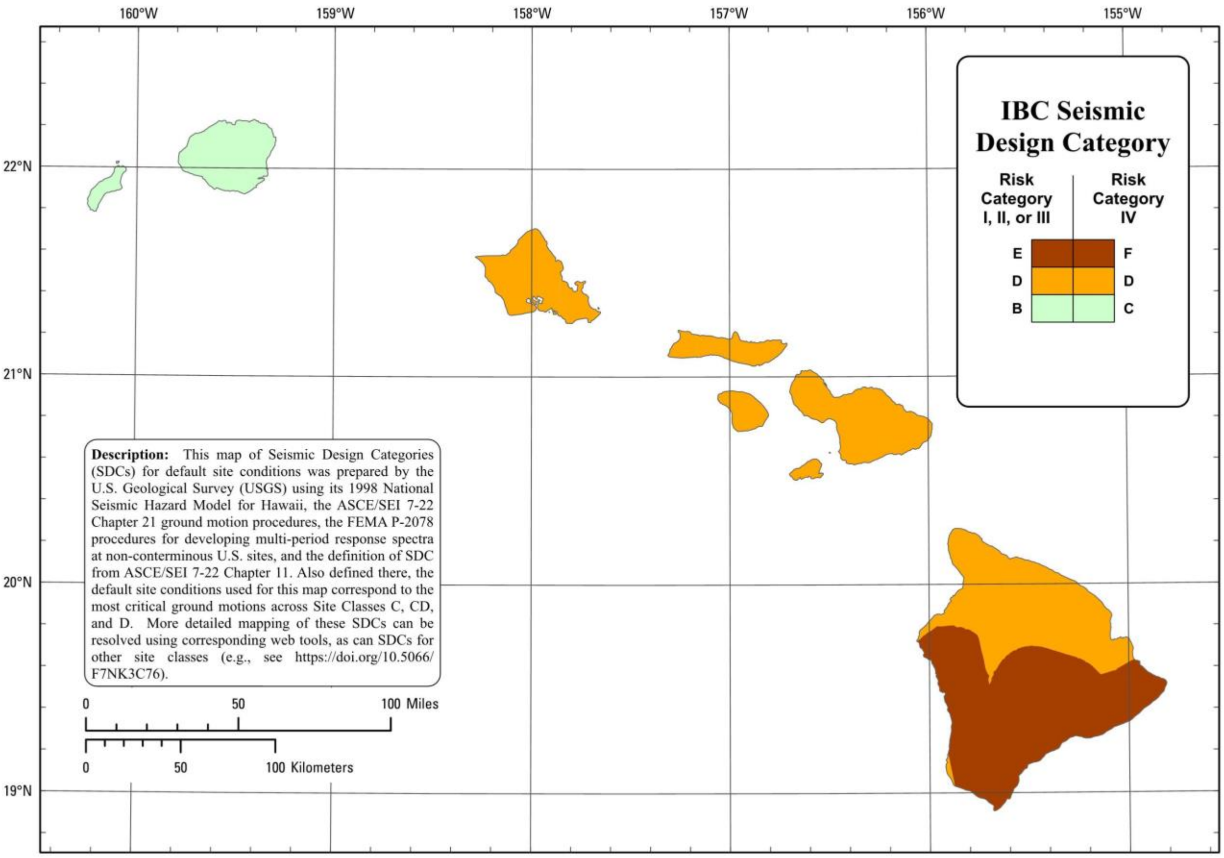
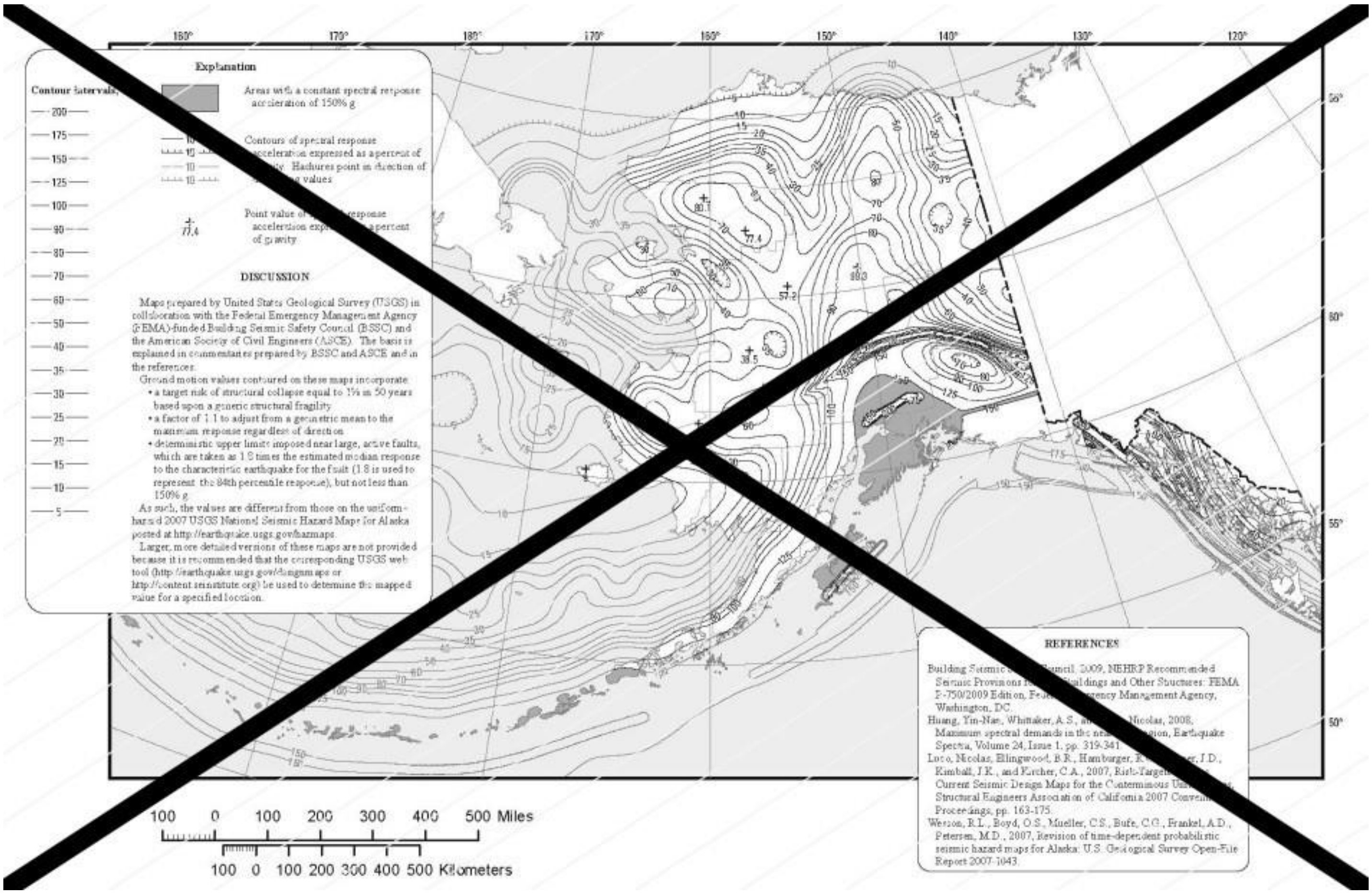
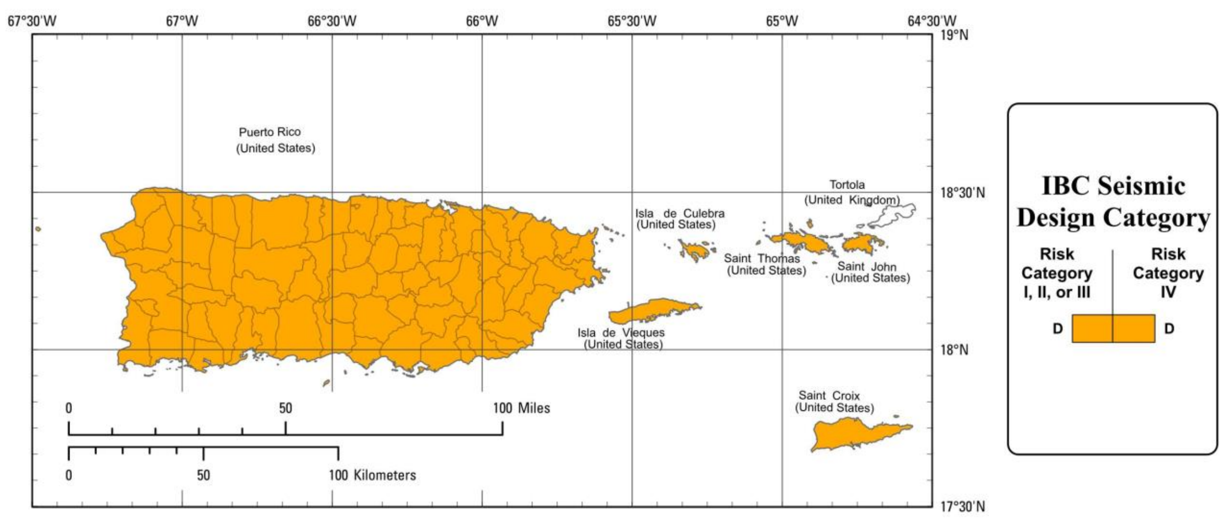


FIGURE1613.2.1(3)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR HAWAII



~~FIGURE 1613.2.1(6) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 02-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

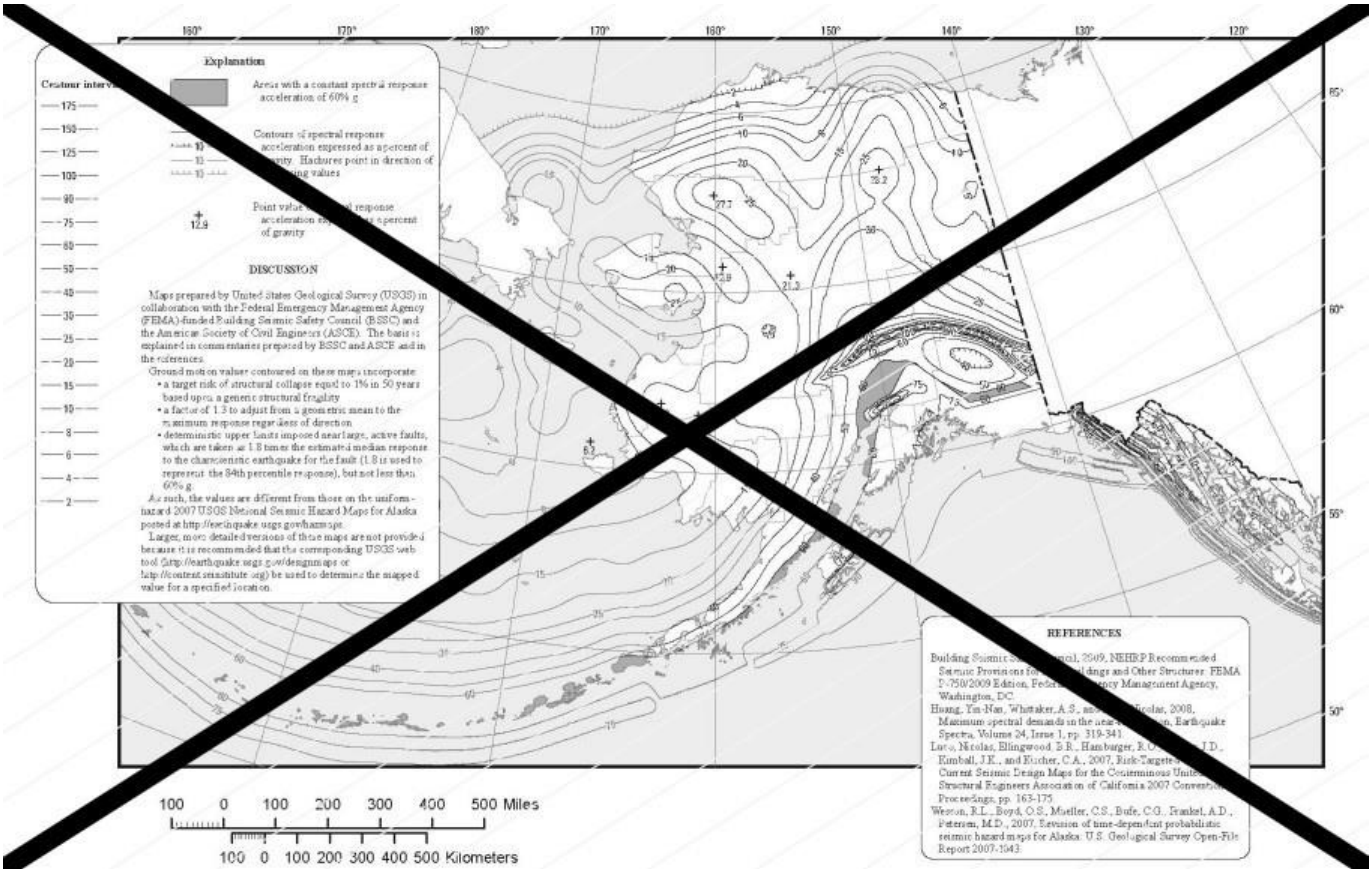


Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the U.S. Virgin Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

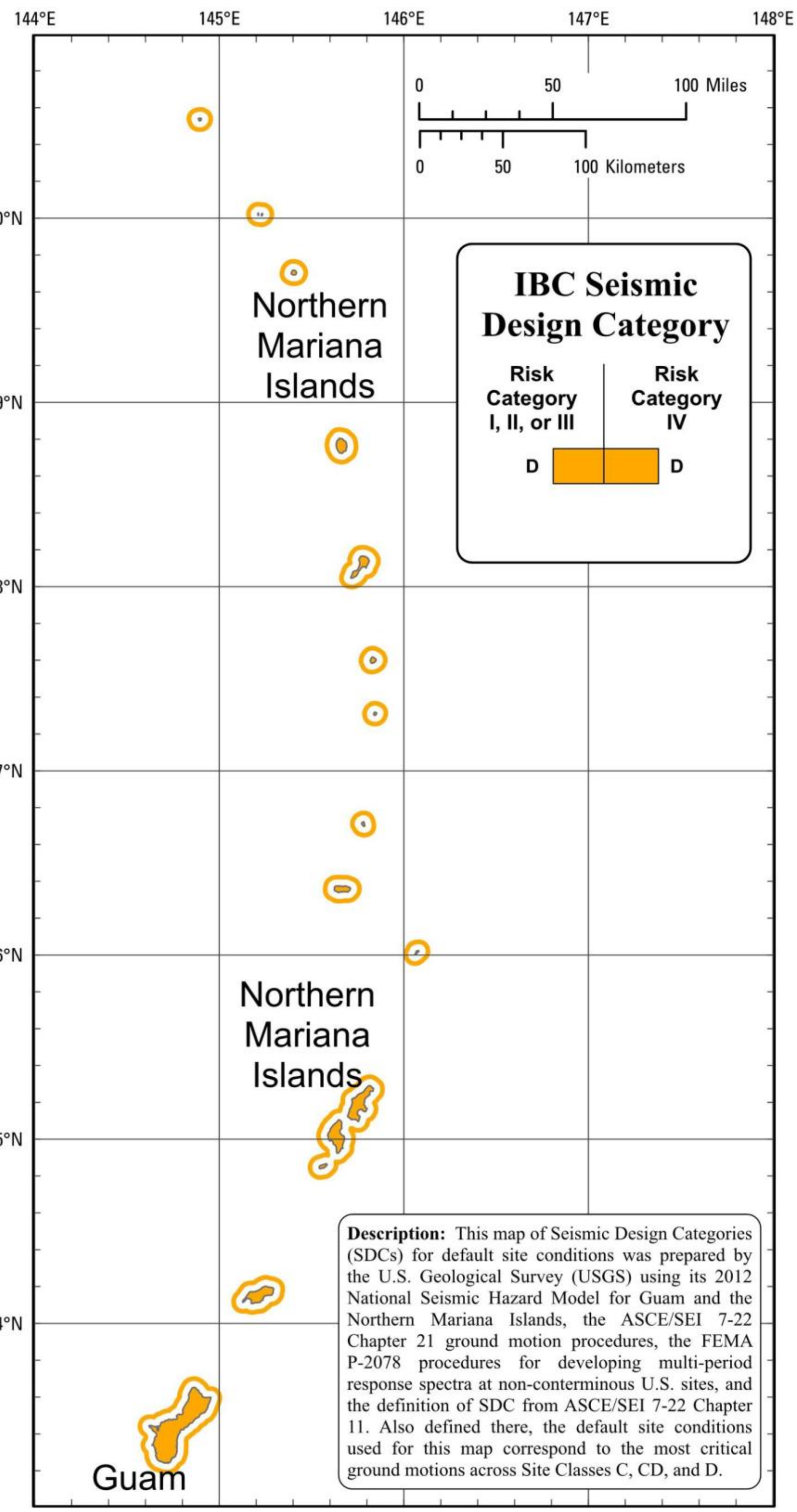
FIGURE 1613.2.1(4)

SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN

ISLANDS



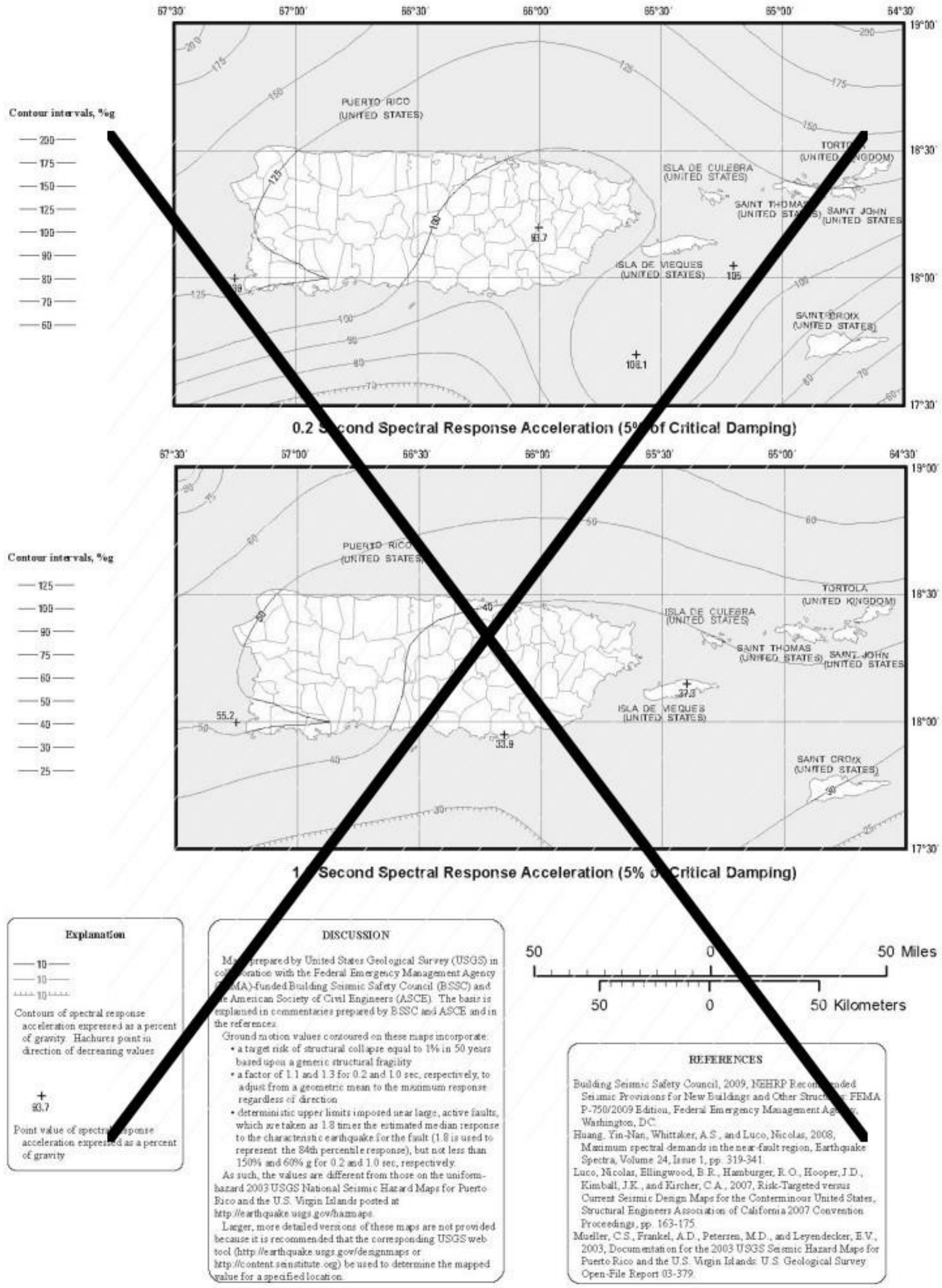
~~FIGURE 1613.2.1(7) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 10-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



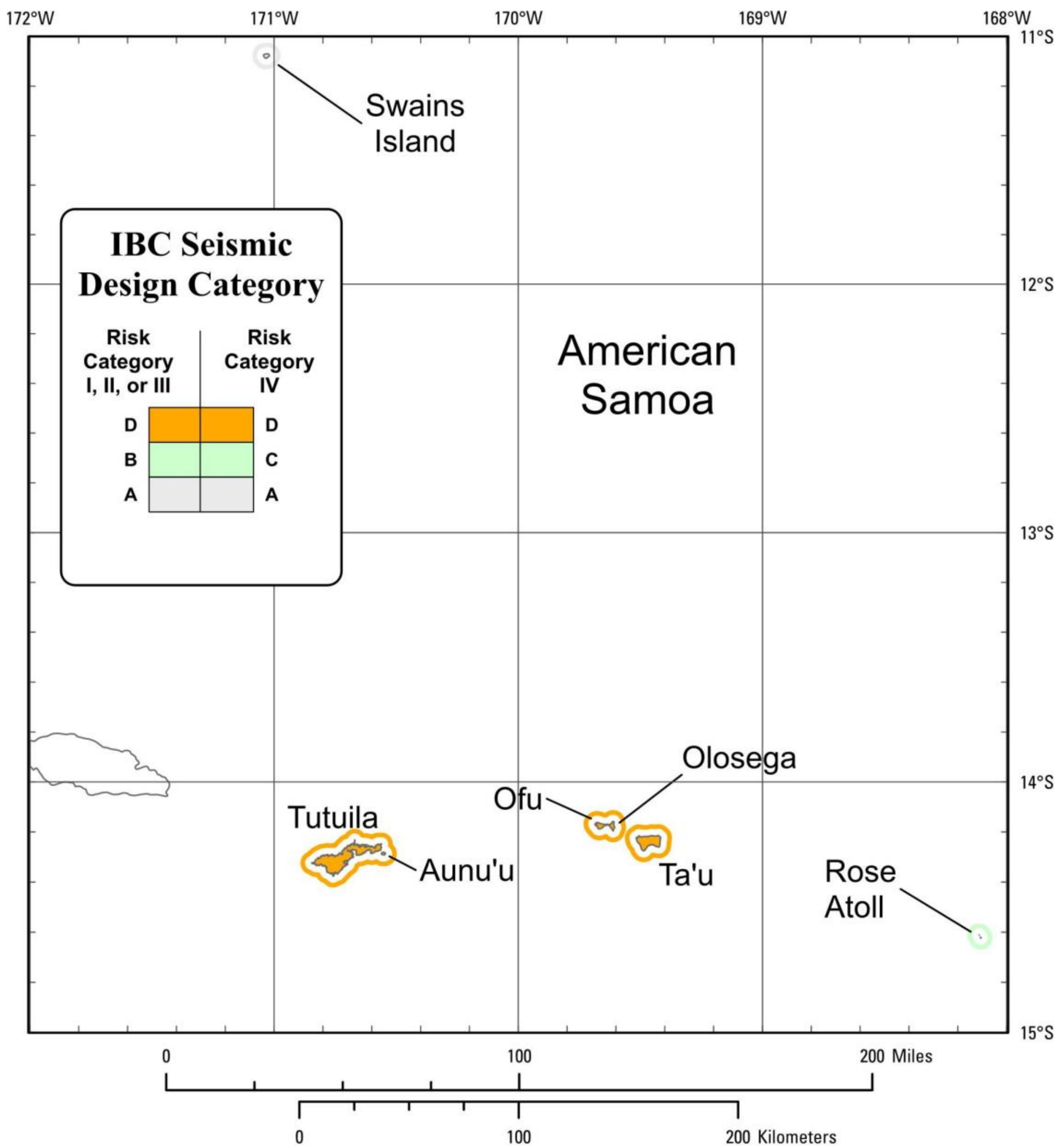
Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for Guam and the Northern Mariana Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE 1613.2.1(5)

SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS



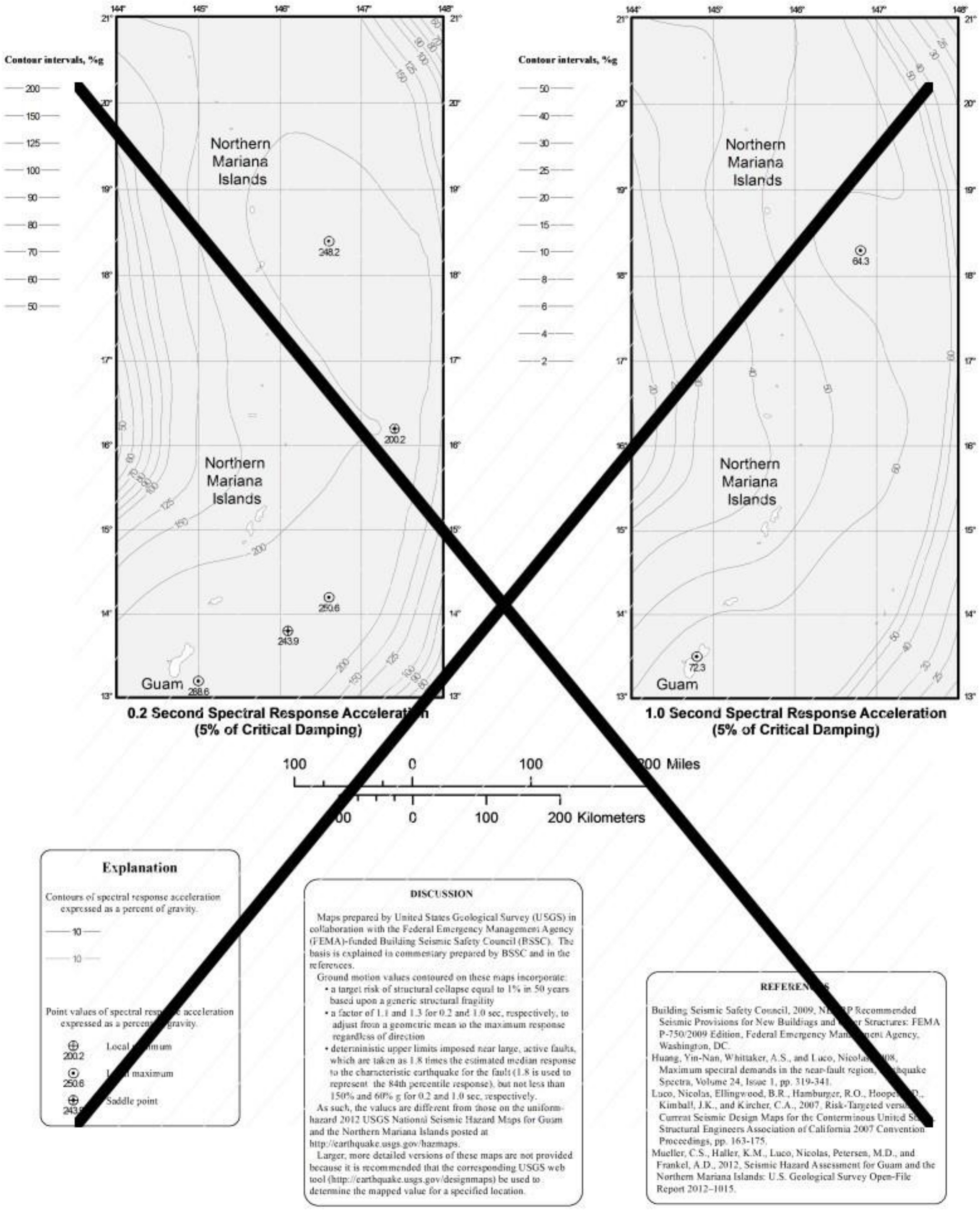
~~FIGURE 1613.2.1(8) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~



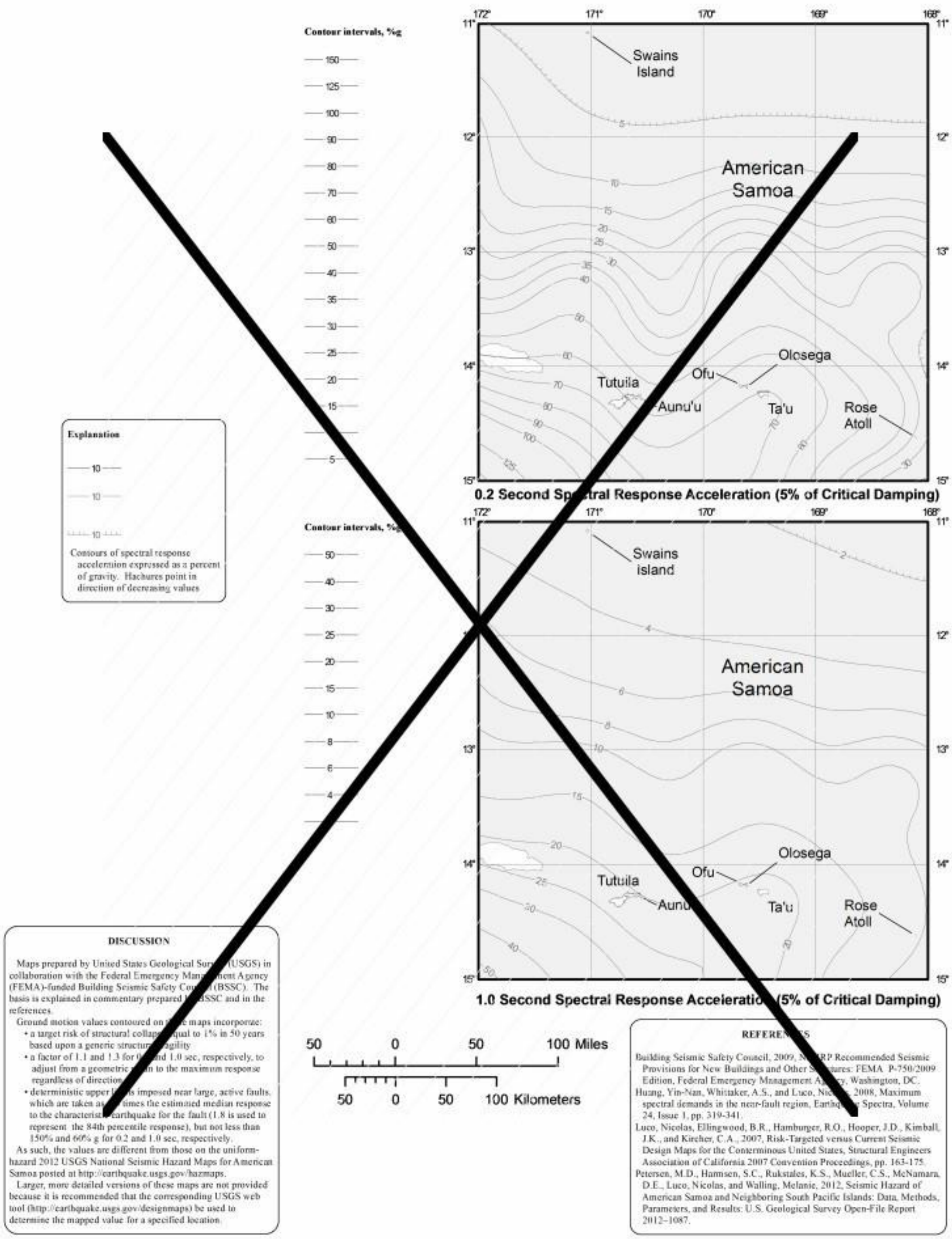
Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE 1613.2.1(6)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR AMERICAN SAMOA

Delete without substitution:



~~**FIGURE 1613.2.1(9) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)**~~



~~FIGURE 1613.2.1(10) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR AMERICAN SAMOA OF 02- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

~~**1613.2.2 Site class definitions.** Based on the site soil properties, the site shall be classified as *Site Class* A, B, C, D, E or F in accordance with Chapter 20 of ASCE 7.~~

~~Where the soil properties are not known in sufficient detail to determine the site class, *Site Class* D, subjected to the requirements of Section 1613.2.3, shall be used unless the *building official* or geotechnical data determines that *Site Class* E or F soils are present at the site.~~

~~Where site investigations that are performed in accordance with Chapter 20 of ASCE 7 reveal rock conditions consistent with *Site Class* B,~~

~~but site-specific velocity measurements are not made, the *site coefficients* F_a and F_v shall be taken at unity (1.0).~~

~~**1613.2.3 Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters.** The maximum considered earthquake spectral response acceleration for short periods, S_{MS}, and at 1-second period, S_{M1}, adjusted for site class effects shall be determined by Equations 16-20 and 16-21, respectively:~~

$$S_{MS} = F_a S_S$$ **~~(Equation 16-20)~~**

$$S_{M1} = F_v S_1$$ **~~(Equation 16-21)~~**

~~but S_{MS} shall not be taken less than S_{M1} Except when determining the seismic design caregory in accordance with Section 1613.2.5.~~

~~where:~~

~~F_a = Site coefficient defined in Table 1613.2.3(1).~~

~~F_v = Site coefficient defined in Table 1613.2.3(2).~~

~~S_S = The mapped spectral accelerations for short periods as determined in Section 1613.2.1.~~

~~S_1 = The mapped spectral accelerations for a 1-second period as determined in Section 1613.2.1.~~

~~Where *Site Class* D is selected as the default site class per Section 1613.2.2, the value of F_a shall be not less than 1.2. Where the simplified design procedure of ASCE 7 Section 12.14 is used, the value of F_a shall be determined in accordance with ASCE 7 Section 12.14.8.1, and the values of F_v, S_{MS} and S_{M1} need not be determined.~~

~~TABLE 1613.2.3(1) VALUES OF SITE COEFFICIENT F_a~~[a]

SITE CLASS	MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT SHORT PERIOD					
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S = 1.25$	$S_S \ge 1.5$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.9	0.9	0.9	0.9	0.9	0.9
C	1.3	1.3	1.2	1.2	1.2	1.2
D	1.6	1.4	1.2	1.1	1.0	1.0
E	2.4	1.7	1.3	Note b	Note b	Note b
F	Note b	Note b	Note b	Note b	Note b	Note b

a. ~~Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period, S_S.~~

b. ~~Values shall be determined in accordance with Section 11.4.8 of ASCE 7.~~

~~TABLE 1613.2.3(2) VALUES OF SITE COEFFICIENT F_V~~[a]

SITE CLASS	MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT 1-SECOND PERIOD					
	$S_1 \le 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 0.4$	$S_1 = 0.5$	$S_1 \ge 0.6$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.8	0.8	0.8	0.8	0.8	0.8
C	1.5	1.5	1.5	1.5	1.5	1.4
D	2.4	2.2[c]	2.0[c]	1.9[c]	1.8[c]	1.7[c]
E	4.2	3.3[c]	2.8[c]	2.4[c]	2.2[c]	2.0[c]
F	Note b	Note b	Note b	Note b	Note b	Note b

~~a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at 1-second period, S_1.~~

~~b. Values shall be determined in accordance with Section 11.4.8 of ASCE 7.~~

~~c. See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7.~~

~~**1613.2.4 Design spectral response acceleration parameters.** Five-percent damped design spectral response acceleration at short periods, S_{DS}, and at 1-second period, S_{D1}, shall be determined from Equations 16-22 and Equation 16-23, respectively:~~

$$S_{DS} = \frac{2}{3}S_{MS} \quad \textbf{(Equation 16-22)}$$

$$S_{D1} = \frac{2}{3}S_{M1} \quad \textbf{(Equation 16-23)}$$

~~where:~~

~~S_{MS} = The maximum considered earthquake spectral response accelerations for short period as determined in Section 1613.2.3.~~

~~S_{M1} = The maximum considered earthquake spectral response accelerations for 1-second period as determined in Section 1613.2.3.~~

~~**1613.2.5 Determination of seismic design category.** Structures classified as *Risk Category* I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to *Seismic Design Category* E. Structures classified as *Risk Category* IV that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to *Seismic Design Category* F. Other structures shall be assigned to a *seismic design category* based on their *risk category* and the design spectral response acceleration parameters, S_{DS} and S_{D1}, determined in accordance with Section 1613.2.4 or the site-specific procedures of ASCE 7. Each building and structure shall be assigned to the more severe *seismic design category* in accordance with Table 1613.2.5(1) or 1613.2.5(2), irrespective of the fundamental period of vibration of the structure, T.~~

~~TABLE 1613.2.5(1) SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION~~

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

~~TABLE 1613.2.5(2) SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION~~

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

~~**1613.2.5.1 Alternative seismic design category determination.** Where S_1 is less than 0.75, the *seismic design category* is permitted to be determined from Table 1613.2.5(1) alone where all of the following apply:~~

1. ~~In each of the two *orthogonal* directions, the approximate fundamental period of the structure, T_a, in each of the two *orthogonal* directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 T_s determined in accordance with Section 11.8.6 of ASCE 7.~~

2. ~~In each of the two *orthogonal* directions, the fundamental period of the structure used to calculate the *story* drift is less than T_s.~~

3. ~~Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_s.~~

4. ~~The *diaphragms* are rigid or are permitted to be idealized as rigid in accordance with Section 12.3.1 of ASCE 7 or, for *diaphragms* permitted to be idealized as flexible in accordance with Section 12.3.1 of ASCE 7, the distances between vertical elements of the *seismic force-resisting system* do not exceed 40 feet (12 192 mm)~~.

Revise as follows:

1613.3 ~~**1613.2.5.2**~~ **Simplified design procedure.** Where the alternate simplified design procedure of ASCE 7 is used, the *seismic design category* shall be determined in accordance with ASCE 7.

1613.4 ~~**1613.3**~~ **Ballasted photovoltaic panel systems.** Ballasted, roof-mounted *photovoltaic panel systems* need not be rigidly attached to the roof or supporting structure. Ballasted non-penetrating systems shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. Ballasted nonpenetrating systems shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to *Seismic Design Category* C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response-hi *story* or other *approved* analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.

Delete without substitution:

~~**[BS] RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS.** The most severe earthquake effects considered by this code, determined for the orientation that results in the largest maximum response to horizontal ground motions and with adjustment for targeted risk.~~

Revise as follows:

[BS] SITE CLASS. A classification assigned to a site based on the types of soils present and their engineering properties as defined in Chapter 20 of ASCE/SEI-7. ~~Section 1613.2.2.~~

Delete without substitution:

~~**[BS] SITE COEFFICIENTS.** The values of F_a and F_v indicated in Table 1613.2.3(1) and Table 1613.2.3(2), respectively.~~

Revise as follows:

1810.3.9.4.2.1 Site Classes A through DE. For *Site Class* A, B, BC, C, CD, D or ~~D~~ DE sites, transverse confinement reinforcement shall be provided in the element in accordance with Sections 18.7.5.2, 18.7.5.3 and 18.7.5.4 of ACI 318 within three times the least element dimension of the bottom of the pile cap. A transverse spiral reinforcement ratio of not less than one-half of that required in Table 18.10.6.4(g) of ACI 318 shall be permitted.

1603.1.5 Earthquake design data. The following information related to seismic *loads* shall be shown, regardless of whether seismic *loads* govern the design of the lateral force-resisting system of the structure:

1. *Risk category*.
2. Seismic importance factor, I_e.
3. ~~Mapped s~~ Spectral response acceleration parameters, S_S and S_1.
4. *Site class*.

5. Design spectral response acceleration parameters, S_{DS} and S_{D1}.
6. *Seismic design category*.
7. Basic seismic force-resisting system(s).
8. Design base shear(s).
9. Seismic response coefficient(s), *CS*.
10. Response modification coefficient(s), *R*.
11. Analysis procedure used.

J104.4 Liquefaction study. For sites with ~~mapped~~ maximum considered earthquake spectral response accelerations at short periods (S_s) greater than 0.5g as determined by Chapter 11 of ASCE 7 ~~Section 1613~~, a study of the liquefaction potential of the site shall be provided and the recommendations incorporated in the plans.

Exception: A liquefaction study is not required where the *building official* determines from established local data that the liquefaction potential is low.

L101.1 General. Every structure located where the 1-second spectral response acceleration, S_1, determined in accordance with Chapter 11 of ASCE 7 ~~Section 1613.2~~, is greater than 0.40 and either exceeds six stories in height with an aggregate floor area of 60,000 square feet (5574 m^2) or more, or exceeds 10 *stories* in height regardless of floor area, shall be equipped with not fewer than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal simplifies IBC Section 1613 by providing Seismic Design Category (SDC) maps that users can reference to quickly determine a project's SDC based on default site conditions. These maps are intended to replace current ground motion response accelerations maps in the IBC and have been derived based on the new multi-period response spectra (MPRS) procedures of ASCE/SEI 7-22. This proposal is an alternative to a similar ASCE proposal that updates the seismic maps.
The SDC maps are one of two methods that will be provided in the IBC to determine SDC. Users are still allowed to determine the SDC following ASCE/SEI 7-22 provisions, where more refined information such as site-specific soils data can be considered.

The introduction of SDC maps within the IBC will address 2 primary issues:

1. SDC maps are intuitive and can be used directly by all disciplines and users.
2. Use of SDC maps will reduce the total number of maps that would otherwise be required to reflect updated ASCE/SEI 7-22 provisions.

Use by all Disciplines

SDC maps shifts determination of SDC per the ASCE/SEI 7-22 provisions from the user to USGS (map developer), for default site classes. These maps will allow building officials, non-structural engineers, component manufacturers, etc. to quickly identify a conservative SDC based on location alone.

The current process to determine the SDC under the 2021 IBC begins with users identifying S_s and S_1 from one of the 10 risk-targeted maximum considered earthquake (MCE_R) ground motion response acceleration maps. In combination with coefficients based on soil type, these parameters are then used to determine S_{MS} and S_{M1}, followed by S_{DS} and S_{D1}, and the user ultimately determines SDC based on the S_{DS} and S_{D1} values. This can in many instances be reduced to a one-step process if the SDC maps in this proposal are adopted.

Total Number of Maps

Should this proposal of six SDC maps not be adopted, the new MPRS procedures of ASCE/SEI 7-22 (as per the ASCE proposal) will result in more maps. Because site class coefficients (F_a and F_v) have been incorporated into the new MPRS procedures, S_1 and S_s maps are no longer relevant and F_a and F_v are no longer utilized or specified in ASCE 7. In lieu of the S_s and S_1 values previously provided by MCE_R

maps, ground motion acceleration maps will now provide S_{DS} and S_{D1} values directly. Following are the number of maps that would be required per the USGS, depending on the site conditions made available for the user. This SDC map proposal will include a total of 6 maps, the least possible number of maps in Section 1613.

- 12 maps: S_{MS} and S_{M1} maps for default site conditions only
- 54 maps: SDC maps for all site classes
- 108 maps: S_{MS} and S_{M1} maps for all site classes

Technical Information

The SDC maps in Section 1613.2 have been derived based on the ASCE/SEI 7-22 procedures, so the results will be consistent between the SDC maps and ASCE/SEI 7-22 ground motion maps, for default site conditions. Both sets of maps are based on the 2018 U.S. Geological Survey (USGS) National Seismic Hazard Model (NSHM) for the conterminous U.S., the ground motion procedures (Chapter 21) of ASCE/SEI 7-22, and the definition of SDC (Chapter 11) in ASCE/SEI 7-22. The maps for the states and territories outside of the conterminous U.S. are based on the FEMA P-2078 procedures, referenced in ASCE/SEI 7-22. FEMA P-2078 procedures allow the multi-period response spectra (MPRS) to be approximated for Alaska, Hawaii, Guam and the Northern Mariana Islands, and American Samoa, where older USGS NSHMs did not provide the full spectrum and site classes for MPRS in these states and territories.

Incorporated into both the SDC maps in this proposal and the ASCE/SEI 7 maps is the use of multi-period response spectra (MPRS), introduced by ASCE/SEI 7-22 to improve the accuracy of the frequency content of earthquake design ground motions and to enhance the reliability of the seismic design parameters derived from these ground motions. These improvements make better use of the available earth science, which has, in general, sufficiently advanced to accurately define spectral response for different site conditions over a broad range of periods. The result of the MPRS is to incorporate increased spectral demand for structures with mid-range fundamental periods on soft-soil sites where ground motion hazard is dominated by large magnitude events. Use of MPRS eliminates the need for site-specific hazard analysis, as required by ASCE 7-16 on soil sites in areas of high seismicity. Internet tools such as those found on the ASCE and ATC websites will continue to be available to provide values of S_{DS}, S_{D1} and S_1 in a very simple way based on longitude/latitude or address to permit determination by AHJs and engineers for all structures where MPRS are not needed for design. It should be noted, all design values needed for design including seismic ground motion parameter are now available for free on the ASCE website.

For the conterminous U.S., the proposed updates to the IBC SDC maps, like the map updates already adopted by the 2020 NEHRP Provisions and ASCE/SEI 7-22, are based on (1) recommendations of the Project 17 collaboration between the Building Seismic Safety Council (BSSC) and the USGS (BSSC, 2019), and (2) the 2018 update of the USGS NSHM (Petersen et al., 2020) for the conterminous U.S. The Project 17 recommendations include modifications to (1) site-class effects, (2) spectral periods defining short-period and one-second ground-motion parameters, (3) deterministic caps on the otherwise probabilistic ground motions, and (4) maximum-direction scale factors. The updates in the 2018 USGS NSHM from the previous (2014) version (used in the 2018 and 2021 versions of the IBC include incorporation of (1) new NGA-East and other ground-motion models for the central and eastern U.S., (2) deep sedimentary basin effects in the Los Angeles, Seattle, San Francisco, and Salt Lake City regions, (3) earthquakes that occurred in 2013 through 2017, and (4) updated weights for the western U.S. ground-motion models.

Summary of Specific Changes

Section 1613.1 Scope – Exception 1 for one- and two-family dwellings will be based solely on being assigned to *Seismic Design Category* A, B or C.

Section 1613.2 Seismic ground motion values

is being renamed to **Determination of seismic design category**, consistent with the proposal to incorporate SDC maps. The SDC maps are based on default site conditions, as assigned by ASCE/SEI 7. Where Site Class DE, E, or F soils are present, the determination of seismic design category needs to be in accordance with ASCE/SEI 7-22. For all other site classifications, two options for assigning SDC are provided: (1) using the SDC maps for default site conditions or (2) going through procedures outlined in ASCE/SEI 7-22 for any site class. Use of the proposed SDC maps (option 1) will provide an upper bound assignment of SDC for all sites except for Site Class DE, E, or F soils; this is intended to provide quick and easy information for instances when further refinement of SDC assignment is not desired. For instances where further refinement is desired, the ASCE/SEI 7-22 provisions (option 2) are the appropriate tool.

The user is instructed to use the maps to determine SDC based on the structure's assigned Risk Category. It is important to note that for a given location, there is only one map provided; each map contains a dual scale in the legend, one portion assigning SDC for Risk Categories I, II and III, and the second portion assigning SDC for Risk Category IV.

It is noted that these SDC maps have been specifically developed for the IBC, as seen by the legend which indicates "IBC Seismic Design

Category." These are different and distinct from the IRC Seismic Design Category maps, which have been developed with rules and assumptions specific to dwellings that fall within the scope of the IRC.

Except for the renumbered **Section 1613.3 Simplified design procedure** (previously 1613.2.5.2), the remainder of Section 1613 is deleted by this proposal. The information in these sections is no longer current or necessary.

https://www.cdpaccess.com/proposal/8312/25387/files/download/2931/

Bibliography: BSSC, 2019. BSSC Project 17 Final Report, Development of the Next Generation of Seismic Design Value Maps for the 2020 NEHRP Provisions, National Institute of Building Sciences, Washington, D.C., December 2019.
Petersen et al., 2019. "*The 2018 update of the US National Seismic Hazard Model: Overview of model and implications*," Earthquake Spectra, Earthquake Engineering Research Institute, Oakland, CA, November 2019.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will slightly increase the cost of construction in some regions and slightly decrease it in other regions. In aggregate, the cost of construction is not changed. Specifically, any impact on construction cost, as reflected in design loads, will vary by site location, spectral response period and site class. For certain combinations of site location, spectral response periods and site class, proposed design spectral acceleration parameter values (S_{DS} and S_{D1}) are larger than those of ASCE 7-16, while for other combinations of site location, spectral response periods and site class, proposed values of S_{DS} and S_{D1} are smaller than those of ASCE 7-16. However, parameter values of S_{MS} and S_{M1} (which are used to determine design loads) included in ASCE 7-22 are generally within +/- 15% of those of ASCE 7-16 for sites in the conterminous US assuming default site conditions.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1613.2 Determination of Seismic Design Category. Structures shall be assigned to a *Seismic Design Category* based on one of the following methods unless the authority having jurisdiction or geotechnical data determines that *Site Class* DE, E or F soils are present at the site. Where *Site Class* DE, E or F soils are present, the *Seismic Design Category* shall be determined in accordance with ASCE 7. ~~Seismic ground motion values shall be determined in accordance with this section~~.

1. Using Figures 1613.2(1) through 1613.2(6) based on the structure *Risk Category*, or
2. Determined in accordance with ASCE 7.

Committee Reason: Approved as modified as the proposal is consistent with ASCE 7-22 and simplifies Section 1613. The modification deletes an unnecessary sentence from section 1613.2. (Vote: 14-0)

Final Hearing Results

S128-22 AM

S132-22

Original Proposal

IBC: 1613.3

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

2021 International Building Code

Revise as follows:

1613.3 Ballasted photovoltaic panel systems. Ballasted, roof-mounted *photovoltaic (PV) panel systems* need not be rigidly attached to the roof or supporting structure. ~~Ballasted non-penetrating systems~~ Ballasted, unattached *PV panel systems* shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. ~~Ballasted nonpenetrating systems~~ Ballasted, unattached *PV panel systems* shall be designed to resist sliding and uplift using design methods and associated criteria from ASCE 7. ~~resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to *Seismic Design Category* C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response-hi *story* or other *approved* analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.~~

Reason: Ballasted, unattached PV systems are considered in ASCE 7-16 Section 13.6.12, which will have some updates in ASCE 7-22. As ASCE 7 language is now in effect, we believe there is general agreement that the language in IBC Section 1613.3 can be simplified. It is important to keep the language in IBC Section 1613.3 that indicates ballasted, unattached PV systems can only be installed on roof with slopes not more than 1:12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will neither increase nor decrease the cost of construction, as it is just a simplification of language for IBC Section 1613.3 now that ASCE 7 language has matured.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1613.3 Ballasted photovoltaic panel systems. Ballasted, roof-mounted *photovoltaic (PV) panel systems* need not be rigidly attached to the roof or supporting structure. Ballasted, unattached *PV panel systems* shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. Ballasted, unattached *PV panel systems* shall be designed to accommodate ~~resist~~ sliding ~~and uplift using design methods and associated criteria from~~ in accordance with ASCE 7 Chapter 13.

Committee Reason: Approved as modified as this proposal appropriately adds a reference to Chapter 13 of ASCE 7 for design to resist sliding and uplift. The modification is a needed change to clarify the intent. (Vote: 14-0)

Final Hearing Results

S132-22 AM

S133-22

Original Proposal

IBC: 1613.4 (New), ASCE/SEI Chapter 35 (New)

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); Robert Bachman, Robert Bachman Consulting Structural Engineer, FEMA/ATC Seismic Code Support Committee (rebachmanse@aol.com)

2021 International Building Code

Add new text as follows:

1613.4 NFPA 13 sprinkler systems. NFPA 13 sprinkler systems, including their anchorage and bracing, shall comply with the seismic design force requirements of ASCE 7 Section 13.3.1.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: The seismic design force equations for nonstructural components provided in Chapter 13 of ASCE/SEI 7-22 have significantly changed since the ASCE 7-16 edition. Sprinkler systems are considered nonstructural components. The current version of NFPA 13 is based on ASCE 7-16 and does not satisfy the ASCE 7-22 seismic requirements and significant changes are required to bring them into compliance. NFPA has been advised that significant changes are needed and it is their intent to attempt to include in their next version scheduled for publication in 2022 or to publish a Tentative Interim Amendment (TIA) after the next edition is published. In the meantime, this proposed language will alert the user and the authority having jurisdiction that the seismic design requirements of ASCE 7-22 must also be satisfied in addition to those of NFPA 13. Hopefully by the time the 2024 IBC will be enforced, the next edition will have been updated to include the needed revisions to comply with ASCE 7-22 or a TIA will have been published so that the user and authority having jurisdiction will have a version of NFPA 13 which will satisfy ASCE 7-22 seismic design requirements.
The proposed change is only required if the edition of ASCE 7 is updated from ASCE 7-16 to ASCE 7-22, as per other code change proposals. Should the update to ASCE 7-22 not be adopted, it is recommended that this code change be disapproved.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not, in general, increase or decrease the overall cost of construction. However, for individual structures, this proposal may reduce the nonstructural component seismic design forces constructed using lateral force-resisting system with higher ductility, which are commonly used regions of high seismic risk while for structures using low or moderate ductility systems the seismic design forces may increase.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1613.4 ~~NFPA 13~~ Automatic sprinkler systems. ~~NFPA 13~~ Where required, *automatic sprinkler system* ~~including their~~ anchorage and bracing, shall comply with ~~the seismic design force requirements of~~ ASCE 7 and Section 903.3.1.1. ~~Section 13.3.1.~~

Committee Reason: Approved as modified as the proposal clarifies the source for the design of anchorage and bracing for automatic sprinkler systems. The modification aptly removes the pointer to NFPA 13 and leaves the pointer to ASCE 7 to add clarification to the provision. (Vote: 14-0)

Final Hearing Results

S133-22	AM

S136-22

Original Proposal

IBC: 1704.2.4

Proponents: Gregory Robinson, National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Revise as follows:

1704.2.4 Report requirement. *Approved agencies* shall keep records of *special inspections* and tests. The *approved agency* shall submit <u>all</u> reports of *special inspections* and tests to the *building official* and to the *registered design professional in responsible charge* <u>*at frequencies required by the approved construction documents or building official. All r*</u>~~R~~eports shall <u>describe the nature and extent of inspections and tests, the location within the structure where the inspections and tests were performed, and</u> indicate that work inspected or tested was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted at a point in time agreed upon prior to the start of work by the owner or the owner's authorized agent to the *building official*.

Reason: This clarifies the nature of acceptable special inspection and test reports. The current code language lacks clarity regarding such reports. Many reports submitted are vague in nature and lacking key information about the inspection performed and where. This proposal addresses the need for more information on the reports to confirm that code required inspects and tests have been performed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies code intent. These changes are not expected to affect cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1704.2.4 Report requirement. *Approved agencies* shall keep records of *special inspections* and tests. The *approved agency* shall submit all reports of *special inspections* and tests to the *building official* and to the *registered design professional in responsible charge* at frequencies required by the approved construction documents or *building official. All r*eports shall describe the nature and extent of inspections and tests, the location ~~within the structure~~ where the inspections and tests were performed, and indicate that work inspected or tested was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted at a point in time agreed upon prior to the start of work by the owner or the owner's authorized agent to the *building official*.

Committee Reason: Approved as modified as the proposal provides a clear direction on what should be in the reports. The modification adds needed clarification by deleting the phrase 'within the structure' in section 174.2.4. (Vote: 11-3)

Final Hearing Results

S137-22

Original Proposal

IBC: 1704.3, 1704.3.1

Proponents: Gregory Robinson, National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

1704.3 Statement of special inspections. Where *special inspections* or tests are required by Section 1705, the *registered design professional in responsible charge* shall prepare a statement of *special inspections* in accordance with Section 1704.3.1 for submittal by the applicant in accordance with Section 1704.2.3.

Exception: The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *building official* for construction not designed by a *registered design professional*.

Revise as follows:

1704.3.1 Content of statement of special inspections. The statement of *special inspections* shall identify the following:

1. The materials, systems, components and work required to have *special inspections* or tests by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspections* or tests for seismic or wind resistance as specified in Sections 1705.12, 1705.13 and 1705.14 .
5. For each type of *special inspection*, identification as to whether it will be continuous *special inspection*, periodic *special inspection* or performed in accordance with the notation used in the referenced standard where the inspections are defined.
6. <u>Deferred submittal items that may require a supplemental statement of special inspections to be prepared.</u>

Reason: This proposal is complimentary to the proposed modifications to Section 107.3.4.1.1. The proposed language is intended to have the registered design professional in responsible charge, who is responsible for the overall preparation and submission of the statement of special inspections, to identify the deferred submittal items within the statement of special inspections that may require additional special inspections and tests, etc., so that the building official and owner know the associated special inspections and tests have not been provided yet, but they may be expected as part of the deferred submittal. This proposal clarifies that some items have not been fully designed at the time of permit application. Item 1 of Section 1704.3.1 already indicates that the determination of which special inspections or tests are required for work related to deferred submittals by the design professional responsible for its design. The building official and owner, however, may not know that such work will have special inspections or tests that have not been identified in the statement of special inspections submitted at the time of application for permit. Substantial structural systems, components, and connections (e.g., precast concrete structural members and connections, as well as steel moment connections) are often deferred to the contractor to provide the most economical, locally-available solutions for the owner. If these special inspections or tests for work that is part of the deferred submittal are not provided by the registered professional responsible for its design, because they did not know they were responsible for it and thought the architect- or engineer-of-record would specify all special inspections and tests, it could jeopardize the life-safety of the building due to critical elements not undergoing special inspections or tests in accordance with the Code. Overall, this language clarifies that the work related to deferred submittals shall have special inspections or tests determined by the design professional responsible for its design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction, although, by alerting the owner of forthcoming special

inspections and tests that are in addition to those specified in the statement of special inspections submitted at time of application for permit, the associated costs are not unexpected. This proposal clarifies code intent. These changes are not expected to affect cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as the term 'may' is unenforceable. A public comment could improve the proposal. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Gwenyth R. Searer, Wiss, Janney, Elstner Associates, Inc., myself (gsearer@wje.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1704.3.1 Content of statement of special inspections. The statement of *special inspections* shall identify the following:

1. The materials, systems, components and work required to have *special inspections* or tests by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspections* or tests for seismic or wind resistance as specified in Sections 1705.12, 1705.13 and 1705.14 .
5. For each type of *special inspection*, identification as to whether it will be continuous *special inspection*, periodic *special inspection* or performed in accordance with the notation used in the referenced standard where the inspections are defined.
6. Deferred submittal items that ~~may~~ require a supplemental statement of special inspections~~to be prepared.~~

Commenter's Reason: During the Committee Action Hearing, the Committee did not like the use of the word "may" in the proposal because they felt it indicated non-mandatory language. At least two Committee members indicated that they would also prefer to strike the words "to be prepared" as unnecessary language. The Committee indicated that they would like this proposal brought back in the public comment period with these two changes.
The proposal is a good one, and requires that the Statement of Special Inspections must list deferred submittal items that require a supplemental statement of special inspections. This will help avoid "dropped balls" between the engineer-of-record, the building official, and any engineers responsible for the design of the deferred submittals.

For these reasons, I ask that the Assembly approve this proposal as modified by public comment. Thank you.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The original proposal had no significant costs associated with it, and this public comment does not change the intent, the implementation, or the cost of the proposal in any way.

Final Hearing Results

S137-22 AMPC1

S141-22

Original Proposal

IBC: 1705.2.2 (New), AISC Chapter 35 (New)

Proponents: Jon-Paul Cardin, American Iron and Steel Institute, American Institute of Steel Construction (jcardin@steel.org)

2021 International Building Code

Add new text as follows:

1705.2.2 Structural Stainless Steel. *Special inspections* and nondestructive testing of structural stainless steel elements in buildings and portions thereof shall be in accordance with the quality assurance inspection requirements of AISC 370.

Add new standard(s) as follows:

AISC

American Institute of Steel
130 East Randolph Street, Suite 2000
Chicago, IL 60601-6219

ANSI/AISC 370-21	Specification for Structural Stainless Steel Buildings

Reason: AISC 370 - Specification for Structural Stainless Steel Buildings is a new specification developed as a consensus document using ANSI-accredited procedures to provide a uniform practice in the design of structural stainless steel framed buildings. AISC 370 Chapter N addresses the minimum requirements for quality control, quality assurance, and nondestructive testing for structural stainless steel systems for buildings and other structures. The reference to this specification for the design, fabrication and erection of structural stainless steel is proposed to be added to Chapter 22 in another code change proposal. Reference to this standard in IBC Chapter 17 provides design professionals and building professionals with standardized methods for special inspection and nondestructive testing of these structures. The AISC 370 Specification can be downloaded for free at www.aisc.org/publications/steel-standards/

Bibliography: AISC, “ANSI/AISC 370 - Specification for Structural Stainless Steel Buildings", American Institute of Steel Construction, Chicago, IL,
2021 edition.

Cost Impact: The code change proposal will increase the cost of construction
It is likely that the special inspection and nondestructive testing of structural stainless steel buildings and other structures was already being accomplished. However, if it was not being conducted, then these proposed provisions in the building code will ensure that they are accomplished in accordance with AISC 370.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately adds a pointer to AISC 370-21 for structural stainless steel. (Vote: 13-0)

Final Hearing Results

S141-22	AS

S142-22

Original Proposal

IBC: 1705.2.5 (New), SECTION 202 (New), Table 1705.2.5 (New)

Proponents: Gregory Robinson, National Council of Structural Engineers Associations (grobinson@lbyd.com)

2021 International Building Code

Add new text as follows:

1705.2.5 Metal building systems. Special inspections of metal building systems shall be performed in accordance with Sections 1705.2.1, 1705.2.2, 1705.2.3, and 1705.2.4, and in accordance with Table 1705.2.5. The *approved agency* shall perform inspections of the erected *metal building system* to verify compliance with the *approved construction documents.*

Add new definition as follows:

METAL BUILDING SYSTEMS. Metal building systems are professionally engineered structures that typically include basic metal elements such as primary rigid frames, orthogonal braced frames, as well as secondary members such as wall girts and roof purlins, cladding, and rollover bracing, all designed to act as an integrated building system.

Add new text as follows:

Table 1705.2.5 SPECIAL INSPECTIONS OF METAL BUILDING SYSTEMS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Installation of rafter / beam flange braces and column flange braces.	---	X
2. Installation of purlins and girts, including specified lapping.	---	X
3. Purlin and girt restraint / bridging / bracing.	---	X
4. Installation of X-bracing, including proper tightening of X-bracing.	---	X

Reason: This proposal is complimentary to the proposed changes for metal building systems in Chapter 22. Metal building systems are generally highly optimized structures that are heavily dependent on bracing components to work per the design intent. The bracing components often consist of materials that aren't considered to be "structural steel," and therefore inspection of the completed installation of those critical components are often overlooked.

Metal building systems typically contain components that may be made of different types of metal, such as structural steel, cold-formed steel and cables. While the individual components are often covered by the various special inspections and tests found in Section 1705.2.1 through 1705.2.4, the systems used in metal building systems are often unique and not covered by other sections. In addition, metal building systems are generally highly-optimized structures that are heavily dependent on bracing components to work per the design intent. The bracing components often consist of materials that are not considered to be "structural steel," and therefore inspection of the completed installation of those critical components are often overlooked. Therefore, the proposed language is intended to add requirements for commonly-used systems not covered elsewhere.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal may slightly increase the cost of construction, although the new special inspections will improve life-safety by reducing the incorrect construction of metal building systems.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

~~**METAL BUILDING SYSTEMS**~~**.**

~~Metal building systems are professionally engineered structures that typically include basic metal elements such as primary rigid frames, orthogonal braced frames, as well as secondary members such as wall girts and roof purlins, cladding, and rollover bracing, all designed to act as an integrated building system.~~

Table 1705.2.5 SPECIAL INSPECTIONS OF METAL BUILDING SYSTEMS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Installation of rafter / beam flange braces and column flange braces.	---	X
2. Installation of purlins and girts, including specified lapping.	---	X
3. Purlin and girt restraint / bridging / bracing.	---	X
4. Installation of X-bracing, tightened to remove any sag including proper tightening of X-bracing.	---	X

Committee Reason: Approved as modified as the proposal adds the appropriate special inspections for metal building systems. The modification clarifies the X-bracing tightening in Table 1705.2.5. (Vote: 13-0)

Final Hearing Results

S142-22 AM

S143-22

Original Proposal

IBC: TABLE 1705.3

Proponents: Stephen V Skalko, Stephen V. Skalko, P.E. & Assoc. LLC, Precast/Prestressed Concrete Institute (svskalko@svskalko-pe.com); Edith Smith, Precast/Presressed Concrete Institiute, Precast/Presressed Concrete Institiute (esmith@pci.org)

2021 International Building Code

Revise as follows:

TABLE 1705.3 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

Portions of table not shown remain unchanged.

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]	IBC REFERENCE
2. Reinforcing bar welding:			AWS D1.4 ACI 318: 26.6.4 26.13.3	—
a. Verify weldability of reinforcing bars other than ASTM A706;	-	X		
b. Inspect welding of reinforcement for special moment frames, boundary elements of special structural walls, and coupling beams.	X	-		
c. Inspect welded reinforcement splices; and	X	-		
~~b~~ d. Inspect single-pass fillet welds, maximum $^5/_{16}$″; and	-	X		
~~c.~~ e. Inspect all other welds.	X -	X		

For SI: 1 inch = 25.4 mm.

Reason: This proposed change coordinates the special inspection provisions for welding of reinforcing steel in the IBC with the provisions in Section 26.13.3 of ACI 318. New Item 2(b) adds the requirement for continuous inspection of welding of reinforcement in special moment frames, boundary elements of special structural walls, and coupling beams as required by ACI 318 Section 26.13.2(d). Because of the critical nature of welded reinforcement splices, new Item 2(c) is added to require continuous special inspection of all welded reinforcement splices.

Existing Item 2(b) for periodic inspection of single pass fillet welds is renumbered as Item (d). And existing Item 2(c) for special inspection of all other welds is renumbered as Item 2(e) and revised to permit these welds to be performed as a periodic special inspection since the critical welds covered by new Items 2(b) and 2(c) have been re-introduced introduced into the table.

A review of the 2012 or any earlier edition of the IBC would show that the inspection requirements were essentially the same as what is now proposed (and as they are also in ACI 318-19). The requirements have been in their current form since the 2015 IBC, as the result of Code Change S148-12. That code change was said to be organizational; yet it turned out to be a very substantive change. This proposed change corrects the inconsistency.

Cost Impact: The code change proposal will decrease the cost of construction

The cost of precast concrete construction, where welding of reinforcing bars is not uncommon, should decrease modestly through the elimination of unnecessary continuous special inspection in many cases.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

TABLE 1705.3 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]	IBC REFERENCE
2. Reinforcing bar welding:	- X	X -	*(a)* AWS D1.4 ACI 318: 26.13.3 26.13.1.4	—
a. Verify weldability of reinforcing bars other than ASTM A706;	X	-		
b. Inspect welding of reinforcement for special moment frames, boundary elements of special structural walls, and coupling beams.	X	-	*(b)* AWS D1.4 ACI 318: 26.13.3	
c. Inspect welded reinforcement splices	-	X	*(c)* —	
d. Inspect welding of primary tension reinforcement in corbels	-	X	*(d)* —	
e. d. Inspect single-pass fillet welds, maximum $^5/_{16}$″; and			*(e)* AWS D1.4 ACI 318: 26.13.3	
f. e. Inspect all other welds.			*(f)* AWS D1.4 ACI 318: 26.13.3	

For SI: 1 inch = 25.4 mm.

Committee Reason: Approved as modified as per the 1st paragraph of the provided reason statement. The modification provides required specific references in Table 1705.3 and adds the inspection requirements for welding of primary tension reinforcement in corbels as supported by industry. (Vote: 14-0)

Final Hearing Results

S143-22	AM

S144-22

Original Proposal

IBC: 1705.4, SECTION 2109

Proponents: Jason Thompson, National Concrete Masonry Association, Masonry Alliance for Codes and Standards (jthompson@ncma.org)

The primary section number and title shown as deleted (2109) includes the deletion of all sections and subsections within it. For clarity, the full text of these deletions is not shown.

2021 International Building Code

Revise as follows:

1705.4 Masonry construction. *Special inspections* and tests of masonry construction shall be performed in accordance with the quality assurance program requirements of TMS 402 and TMS 602.

Exception: *Special inspections* and tests shall not be required for:

1. Glass unit masonry or masonry veneer designed in accordance with Section 2110 or Chapter 14,~~Empirically designed masonry, *glass unit masonry* or masonry *veneer* designed in accordance with Section 2109, Section 2110 or Chapter 14~~,respectively, where they are part of a structure classified as *Risk Category* I, II or III.
2. Masonry foundation walls constructed in accordance with Table 1807.1.6.3(1), 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4).
3. Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.

Delete without substitution:

~~SECTION 2109~~
~~EMPIRICAL DESIGN OF ADOBE MASONRY~~

Reason: The option for empirically designed masonry has been removed from the 2022 edition of TMS 402. As such, references to these provisions from the IBC are also being deleted - including all of Section 2109 of the IBC. Of note, the scope of Section 2109 is limited to empirically designed adobe masonry construction. Although there is a reference to the empirical design provisions of TMS 402 in Section 2109, there are questions as to whether the use of the empirical design provisions of TMS 402, which were developed for clay and concrete masonry construction, are appropriate and applicable to adobe masonry construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal simply deletes a historical design method that is no longer included in the referenced standard.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal deletes a design method that is no longer in the referenced standard. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Ben Loescher, Architect, The Earthbuilders' Guild (bloescher@lmarchitectsinc.com); David Eisenberg, DCAT (strawnet@gmail.com); Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1705.4 Masonry construction. *Special inspections* and tests of masonry construction shall be performed in accordance with the quality assurance program requirements of TMS 402 and TMS 602.

Exception: *Special inspections* and tests shall not be required for:

1. Glass unit masonry or masonry veneer designed in accordance with Section 2110 or Chapter 14,~~Empirically designed masonry, glass unit masonry or masonry veneer designed in accordance with Section 2109, Section 2110 or Chapter 14,~~ respectively, where they are part of a structure classified as Risk Category I, II or III.
2. Masonry foundation walls constructed in accordance with Table 1807.1.6.3(1), 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4).
3. Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.

SECTION 2109
EMPIRICAL DESIGN OF ADOBE MASONRY

2109.1 General. Empirically designed adobe masonry shall conform to the requirements of Appendix A of TMS 402-16, except where otherwise noted in this section.

2109.1.1 Limitations. The use of empirical design of adobe masonry shall be limited as noted in Section A.1.2 of TMS 402-16. In buildings that exceed one or more of the limitations of Section A.1.2 of TMS 402-16, masonry shall be designed in accordance with the engineered design provisions of Section 2101.2 or the foundation wall provisions of Section 1807.1.5.
Section A.1.2.2 of TMS 402-16 shall be modified as follows:

A.1.2.2 – *Wind*. Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where V_{asd} as determined in accordance with Section 1609.3.1 of the*International Building Code* exceeds 110 mph.

2109.2 Adobe construction. *Adobe construction* shall comply with this section and shall be subject to the requirements of this code for Type V construction, Appendix A of TMS 402-16, and this section.

Commenter's Reason: Summary:
The intent of proposal S144-22, approved in the Committee Action Hearings was to remove the reference in the IBC, to the soon-to-be-retired Appendix A of TMS 402. However this action has the consequence of deleting all language in the IBC pertaining to adobe construction, which will be devastating to a relatively small but significant regional industry for both contemporary and historical adobe structures. This includes material suppliers, design and building professionals and owners and occupants of adobe masonry structures. This Public Comment achieves the goals of the original proposal’s authors while preserving the critical provisions of Section 2109 Empirical Design of Adobe Masonry, to regulate the structural design and material requirements of adobe masonry, which would otherwise become unregulated.

Empirical Design:

The adobe section of the IBC has successfully relied upon the empirical design provisions of TMS 402 without controversy since the IBC's first edition in the year 2000. In recent years TMS 402's authors have decided to no longer use empirical design for contemporary masonry materials, construction methods and building types, because these modern buildings and materials no longer rely on the smaller quantity and size of openings, more frequent cross walls, and shorter walls assumed in Appendix A. These points do not apply to adobe construction whose utilization consists of small, one- or two-story buildings with small openings, cross walls, and conservative height/thickness ratios.

Additionally, adobe is a material for which there is greater variability in mortar and masonry unit qualities than modern masonry products. As a result, cost-effective adobe construction depends upon time-tested and appropriately conservative empirical methods to guide design for the smaller scale projects it is used for, that cannot justify the expense of laboratory testing for each source and product.

TMS 402 Appendix A:

While Appendix A will no longer be included in future editions of TMS 402, retaining reference to the current edition (TMS 402- 16) will allow adobe to remain in the IBC until a standard specific to adobe construction can be created and approved as a referenced standard in the IBC. The proponents of this Public Comment have conferred with The Masonry Society (the propagator of TMS 402), who have confirmed that TMS 402-16 will remain available for the foreseeable future.

Windspeed:

A related Public Comment on Proposal S185-22 proposes to correct a typographical error in 2109.1.1.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction. By avoiding the deletion of code provisions for adobe construction, this Public Comment will provide contractors and consumers the ability to use a building material which is cost-effective in the regions that it is used, and particularly beneficial to owner-builders and projects in rural areas.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
By avoiding the deletion of code provisions for adobe construction, this Public Comment will provide contractors and consumers the ability to use a building material which is cost-effective in the regions that it is used, and particularly beneficial to owner-builders and projects in rural areas.

Final Hearing Results

S144-22	AMPC1

S147-22

Original Proposal

IBC: 1709.5, WDMA Chapter 35 (New)

Proponents: Jeff Inks, Window & Door Manufacturers Association, Window & Door Manufacturers Association (jinks@wdma.com); Craig Drumheller, Window & Door Manufacturers Association (cdrumheller@wdma.com)

2021 International Building Code

Revise as follows:

1709.5 Exterior window and door assemblies. The design pressure rating of exterior windows and doors in buildings shall be determined in accordance with Section 1709.5.1 or 1709.5.2. For exterior windows and doors tested in accordance with Section 1709.5.1 or 1709.5.2, required design wind pressures determined from ASCE 7 shall be permitted to be converted to allowable stress design by multiplying by 0.6.

> **Exception:** Structural wind load design pressures for window or door assembiles other than the size tested in accordance with Section 1709.5.1 or 1709.5.2 shall be permitted to be different than the design value of the tested assembly, provided that such pressures are determined by accepted engineering analysis or validated by an additional test of the window or door assembly to the alternative allowable design pressure in accordance with Section 1709.5.2. Components of the alternate size assembly shall be the same as the tested or labeled assembly. Where engineering analysis is used, it shall be performed in accordance with the analysis procedures of AAMA 2502 <u>or WDMA I.S. 11</u>.

Add new standard(s) as follows:

WDMA

Window and Door Manufacturers Association
2025 M Street NW, Suite 800
Washington, DC 20006

<u>WDMA I.S. 11-2018</u>	<u>Industry Standard for Voluntary Analytical Method for Design Pressure (DP) Ratings of Fenestration Products</u>

Reason: The exception under 1709.5 Exterior window and door assemblies, allows for comparative analysis to be used for determining design pressures of different sized products within a given fenestration product line based on the testing and rating of a prototype unit/s for that product line. As required by the exception under 1709.5, comparative analysis determinations for this purpose must be in accordance with accepted engineering analysis and in accordance with AAMA 2502. *Comparative Analysis Procedure for Window and Door Products.* Comparative analysis alleviates the need for costly testing of all sizes within a product line that isn't necessary saving considerable construction costs and providing greater design flexibility, especially for specialty and custom products.

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Consistent with AAMA 2502, WDMA I.S. 11 -*Industry Standard for Voluntary Analytical Method for Design Pressure (DP) Ratings of Fenestration Products* provides standardized accepted engineering analysis procedures for accurately determining design pressure ratings of window and door assemblies based on comparative analysis accordingly. WDMA I.S. 11 has been included as an accepted comparative analysis methodology for window and door assemblies in section 609.3.1 Comparative analysis of The *International Residential Code* (IRC) since the 2015 edition. Adding WDMA I.S. 11 as an additional comparative analysis option in the exception under section 1709.5 will allow even greater cost effective design flexibility and will also make the IBC consistent with the same requirements in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Including WDMA I.S. 11 does however provide an additional cost saving option for determining design pressures for window and door assemblies using comparative analysis in accordance with the provisions of 1709.5.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provides an acceptable alternate analysis method for the design pressure ratings of fenestration products. (Vote: 14-0)

Final Hearing Results

S147-22	AS

S148-22

Original Proposal

IBC: 1803.5.1, ASTM Chapter 35 (New)

Proponents: Lori Simpson, GeoCoalition (lsimpson@langan.com); Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.1 Classification. Soil materials shall be classified in accordance with ASTM D2487.<u>Rock shall be classified in accordance with ASTM D5878.</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>D5878-19</u> <u>Standard Guides for Using Rock-Mass Classification Systems for Engineering Purpose</u>

Reason: Rock should be classified in accordance with a standard for consistency.

Bibliography: ASTM D5878 Standard Guides for Using Rock-Mass Classification Systems for Engineering Purposes

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change to cost - this change is to make rock classification in accordance with a standard.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the standard assists with the classification of rock. The committee recommended, during public comment, the location be reviewed as locating the provision in section 1803.5.6 could be preferable. (Vote: 14-0)

Final Hearing Results

S148-22	AS

S149-22

Original Proposal

IBC: 1803.5.2

Proponents: Lori Simpson, GeoCoalition (lsimpson@langan.com); Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.2 Questionable soil <u>and rock</u>. Where the classification, strength<u>, moisture sensitivity</u> or compressibility of the soil<u> or rock</u> is in doubt or where a load-bearing value superior to that specified in this code is claimed, the *building official* shall be permitted to require that a geotechnical investigation be conducted.

Reason:

1. Rock should be included as part of the evaluation of questionable material
2. "Moisture-sensitive" is also a questionable characteristic that the building official may consider when requiring a geotechnical investigation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
this change includes rock and adds "moisture sensitive" as a questionable characteristics, which will not change the cost of construction

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. The committee did note that the phrase 'moisture sensitivity' could be clarified. (Vote: 9-5)

Final Hearing Results

S149-22	AS

S151-22

Original Proposal

IBC: 1803.5.3, ASTM Chapter 35 (New)

Proponents: Lori Simpson, GeoCoalition (lsimpson@langan.com); Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.3 Expansive soil. In areas likely to have expansive soil, the *building official* shall require soil tests to determine where such soils do exist.
Soils meeting all four of the following provisions shall be considered to be expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D4318
2. More than 10 percent of the soil particles pass a No.200 sieve (75 μm), determined in accordance with ASTM ~~D422~~D6913.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM ~~D422~~D6913.
4. Expansion index greater than 20, determined in accordance with ASTM D4829.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D6913/D6913M-17	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

Reason: ASTM has retired the older standard D422 and replaced it with D6913.

Bibliography: ASTM D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Updated to current ASTM standard and does not affect cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as ASTM D422 has been replaced with ASTM D6913 as per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S151-22	AS

S152-22

Original Proposal

IBC: 1803.5.4

Proponents: Lori Simpson, GeoCoalition (lsimpson@langan.com); Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.4 ~~Ground-water table~~ Groundwater. A ~~subsurface soil~~ geotechnical investigation shall be performed to determine ~~whether~~if:

1. ~~the existing ground-water table~~ Groundwater is above or within 5 feet (1524 mm) below the elevation of the *lowest floor* level where such floor is located below the finished ground level adjacent to the foundation; and
2. the groundwater depth will affect the design and construction of buildings and structures.

~~**Exception:** A subsurface soil investigation to determine the location of the ground-water table shall not be required where waterproofing is provided in accordance with Section 1805.~~

Reason:

1. "Groundwater" is the more accepted term than "ground-water". ICC might want to review this editorially throughout the IBC code.
2. Knowing the location of groundwater levels are critical for designing and constructing underground structure elements, foundations, and earth retention systems.
3. "Geotechnical investigation" is the term being used throughout Section 1803.5, not "subsurface soil investigation".
4. The exception related to waterproofing is deleted because the inclusion of waterproofing does not eliminate the need to know the location of the groundwater for other purposes, such as hydrostatic pressures as referenced in 1805.2.
5. "Table" is removed from both title and text because there is often no singular "level" or "table"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
this change proposal will not change the cost of construction because the hydrostatic pressure already needed to be accounted for.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. The committee did question the necessity of item 2 in section 1803.5.4. (Vote: 14-0)

Final Hearing Results

S152-22 AS

S153-22

Original Proposal

IBC: 1803.5.6

Proponents: Lori Simpson, GeoCoalition (lsimpson@langan.com); Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1803.5.6 Rock strata. Where ~~subsurface explorations at the project site indicate variations in the structure of rock on which~~foundations are to be constructed on or in rock, ~~a sufficient number of borings shall be drilled to sufficient depths to~~the geotechnical investigation shall assess ~~the~~ variations in rock strata depth, competency, ~~of the rock~~ and ~~its~~ load-bearing capacity.

Reason:

1. The proposed change clarifies the current code provision while preserving its intent.
2. "Geotechnical investigation" is the preferred term rather than "subsurface exploration."
3. There are methods other than borings to investigate depth of rock, including cone penetration testing, test pits, geophysics.
4. Delete "sufficient" as it is vague and therefore unenforceable.
5. The provision to assess rock depth variation was implied but not clearly stated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change maintains the current intent of the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S153-22	AS

S155-22

Original Proposal

IBC: 1806.2

Proponents: Lori Simpson, GeoCoalition (lsimpson@langan.com); Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com)

2021 International Building Code

Revise as follows:

1806.2 Presumptive load-bearing values. The load-bearing values used in design for supporting soilsand rock near the surface shall not exceed the values specified in Table 1806.2 unless data to substantiate the use of higher values are submitted and *approved*. Where the *building official* has reason to doubt the classification, strength or compressibility of the soilor rock, the requirements of Section 1803.5.2 shall be satisfied.

Presumptive load-bearing values shall apply to materials with similar physical and engineering characteristics~~and dispositions~~. ~~Mud~~Very soft to soft clay or silt (CL, CH, MH, ML), very loose to loose silt (ML), organic silt~~,~~ and organic clays (OL, OH), peat (Pt) ~~or unprepared~~ and undocumented fill shall not be assumed to have a presumptive load-bearing capacity unless data to substantiate the use of such a value are submitted.

> **Exception:** A presumptive load-bearing capacity shall be permitted to be used where the*building official* deems the load-bearing capacity ~~of mud, organic silt or unprepared fill~~ is adequate for the support of lightweight or temporary structures.

Reason:

1. Rock is added because presumptive values are provided for rock in Table 1806.2.
2. A "disposition" is not a recognized geotechnical term.
3. Soils are classified in accordance with ASTM D2487, as specified in section 1803.5.1; therefore, soil classifications are shown to conform. "Mud" is not a recognized geotechnical "Class of Material".
4. "Undocumented" fill is a more appropriate term than "unprepared" because there is no record of how it was placed (i.e. it is "undocumented"); therefore, it is assumed that is was not adequately compacted.

Bibliography: ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only changes terminology and does not affect cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1806.2 Presumptive load-bearing values. The load-bearing values used in design for supporting soils and rock near the surface shall not exceed the values specified in Table 1806.2 unless data to substantiate the use of higher values are submitted and *approved*. Where the *building official* has reason to doubt the classification, strength or compressibility of the soil or rock, the requirements of Section 1803.5.2 shall be satisfied.

Presumptive load-bearing values shall apply to materials with similar physical and engineering characteristics. ~~Very soft to soft clay or silt (CL, CH, MH, ML), very loose to loose silt (ML),~~ Mud, organic silt and organic clays (OL, OH), peat (Pt) and undocumented fill shall not be assumed to have a presumptive load-bearing capacity unless data to substantiate the use of such a value are submitted.

Exception: A presumptive load-bearing capacity shall be permitted to be used where the*building official* deems the load-bearing capacity is adequate for the support of lightweight or temporary structures.

Committee Reason: Approved as modified as this aligns terms and provides clarification to the requirements. The modification removes soil types which would be conflicting with the existing presumptive load-bearing values. (Vote: 14-0)

Final Hearing Results

S155-22	AM

S157-22

Original Proposal

IBC: 1807.2.5 (New), 1807.2.5.1 (New), 1807.2.5.2 (New), 1807.2.5.3 (New)

Proponents: Peter Zvingilas, Town of Groton, Region VI; John Grenier, National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com)

2021 International Building Code

Add new text as follows:

1807.2.5 Guards at retaining walls. *Guards* shall be provided in accordance with Sections 1807.2.5.1 through 1807.2.5.3.

1807.2.5.1 Guards. A *guard* shall be located along the top of a retaining wall located along open-sided walking surfaces that are located more than 30 inches (762 mm) measured vertically to the surface or grade below at the exposed face of the retaining wall. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions:

1. Where other barrier(s) are provided that is approved by the *building official*.
2. Where a retaining wall is located where it is not accessible to the public, as determine by the *building official*, a *guard* shall not be required.

1807.2.5.2 Height. Required *guards* at retaining walls shall comply with the height requirements of section 1015.3.

1807.2.5.3 Opening limitations. Required *guards* shall comply with the opening limitations of Section 1015.4.

Reason: To add language to clarify where and how a guard is to be installed on top of a retaining wall that would pose a danger of a fall.

1. The code is currently silent on the requirement for guards on top of retaining walls. These conditions commonly occur on sites (not necessarily buildings that are addressed in Chapter 10) at public places (parks; schools; etc.) that need to have guards.

2. The exception #2 provides a method for conditions where a retaining wall is not accessible to the public and a guard would not be warranted and would be wasteful.

3. Section 1807.2.5.3 Opening Limitations, provides a method to allow the 21” sphere criteria to be used for certain non-public occupancies (industrial sites, etc.).

4. The 30” height requirement is consistent with section **1015.2**; and section **105.2 Work exempt from permit**, items #4 (retaining walls less than 4’ do not require a permit, however that is measured from the bottom of the footing so the grade difference would essentially be 30”), and item # 6 (which is where a sidewalk or driveway with over a 30” grade change would be required to be permitted).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not increase by this change. This change clarifies what is already being done in the industry.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1807.2.5 Guards ~~at retaining walls~~. *Guards* shall be provided at retaining walls in accordance with Sections 1807.2.5.1 through

1807.2.5.3.

Exception: Guards are not required at retaining walls not accessible to the public.

1807.2.5.1 ~~Guards~~ Where required. At retaining walls located within 36 inches (914mm) of walking surfaces, a *guard* shall be required between the walking surface and the open side of the retaining wall where the walking surface is ~~located along the top of a retaining wall located along open-sided walking surfaces that are~~ located more than 30 inches (762 mm) measured vertically to the surface or grade below ~~at the exposed face of the retaining wall~~ at any point within 36 inches (914mm) horizontally to the edge of the open side . *Guards* shall ~~be adequate in strength and attachment in accordance~~comply with Section 1607.9.

~~**Exceptions**:~~

1. ~~Where other barrier(s) are provided that is approved by the *building official*.~~
2. ~~Where a retaining wall is located where it is not accessible to the public, as determine by the *building official*, a *guard* shall not be required.~~

Committee Reason: Approved as modified as this proposal is an important update from a safety aspect. The committee expressed concerns relative to this being a 'site' item vs. a building component. The modification provides needed restructure, clarification and alignment with current code language. (Vote: 11-2)

Final Hearing Results	
S157-22	AM

S158-22

Original Proposal

IBC: 1807.3

Proponents: Andy Williams, Panel Cladding Solutions, National Frame Building Association (panelcladsolutions@gmail.com)

2021 International Building Code

Revise as follows:

1807.3 Embedded posts and poles. Designs to resist both axial and lateral *loads* employing posts or poles as columns embedded in earth or in concrete footings in earth shall be in accordance with Sections 1807.3.1 through 1807.3 <u>or in accordance with ASABE EP 486.3</u>.

Reason: This proposal adds a reference for ASABE EP 486.3 to Section 1807.3 (Embedded posts and poles) where discussion of this type of foundation takes place. ASABE EP 486.3 is currently referenced in Table 2306.1 along with the other ASABE Engineering Practice (EP) standards recognized for use in post frame design. While the other EPs reference wood framing elements and issues used in post-frame construction, EP 486.3 is specifically designed to aid in the determination of soil strength for shallow post and pier foundation design. Since the initial 2000 IBC, the National Frame Building Association (NFBA) has received a number of inquiries from building officials requesting why there is not reference to this design standard in Chapter 18 Soils and Foundations where it truly belongs. Addition of EP 486.3 to Section 1807.3 puts the foundation and soil design reference for post frame construction in the appropriate chapter and keeps the building official from having to link this already recognized reference standard in Table 2306.1 to foundation design based on the requirements of Chapter 18.

National Frame Building Association (NFBA) is a trade association that promotes the interests of the post-frame construction industry and its members including post-frame builders, suppliers, manufacturers, building material dealers, code and design professionals, and structural engineers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply moves an existing referenced standard from Chapter 23 to Chapter 18. No additional testing or costs should be associated with this move.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adds flexibility of design of embedded posts and poles by appropriately adding a pointer to ASABE EP 486.3. (Vote: 14-0)

Final Hearing Results

S158-22	AS

S160-22

Original Proposal

IBC: 1807.3.2.2

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1807.3.2.2 Constrained. The following formula shall be used to determine the depth of embedment required to resist lateral *loads* where lateral constraint is provided at the ground surface, such as by a rigid floor or pavement. Hot-mix asphaltic concrete shall not be considered a rigid pavement.

$$d = \sqrt{\frac{4.25Ph}{S_3 b}}$$ **(Equation 18-2)**

or alternatively

$$d = \sqrt{\frac{4.25M_g}{S_3 b}}$$ **(Equation 18-3)**

where:

M_g = Moment in the post at grade, in foot-pounds (kN-m).

S_3 = Allowable lateral soil-bearing pressure as set forth in Section 1806.2 based on a depth equal to the depth of embedment in pounds per square foot (kPa).

Reason: This code change will answer the common question that arises when an embedded post or pole foundation is used with an adjacent hot-mix asphaltic concrete pavement surface.

Hot-mix asphaltic concrete does not undergo a chemical reaction to obtain its stiffness like portland cement does. Hot-mix asphaltic concrete's stiffness is entirely dependent on its temperature, as such it may behave like a rigid floor surface when it is very cold, but does not do so when it is hot. This transient stiffness nature makes it inappropriate to use as a rigid constraint to reduce a footing's embedment under lateral loads which may occur regardless of the temperature.

Cost Impact: The code change proposal will increase the cost of construction

This proposal will increase the cost of foundations that inappropriately assume that asphaltic concrete is capable of providing a rigid constraint.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1807.3.2.2 Constrained. The following formula shall be used to determine the depth of embedment required to resist lateral *loads* where lateral constraint is provided at the ground surface, such as by a rigid floor or slab-on-ground. ~~pavement. Hot-mix asphaltic concrete shall not be considered a rigid pavement.~~

$$d = \sqrt{\frac{4.25Ph}{S_3 b}}$$ **(Equation 18-2)**

or alternatively

$$d = \sqrt{\frac{4.25M_g}{S_3 b}}$$ **(Equation 18-3)**

where:

M_g = Moment in the post at grade, in foot-pounds (kN-m).

S_3 = Allowable lateral soil-bearing pressure as set forth in Section 1806.2 based on a depth equal to the depth of embedment in pounds per square foot (kPa).

Committee Reason: Approved as modified to clarify the intent of the requirements to prevent the use of apparently flexible pavements to provide lateral constraint. The modification provides clarification to the intent. (Vote: 14-0)

Final Hearing Results	
S160-22	AM

S162-22

Original Proposal

IBC: 1808.8.6

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, self (kcobeen@wje.com); Ronald LaPlante, Division of State Architect, Self (ron.laplante@dgs.ca.gov)

2021 International Building Code

Revise as follows:

1808.8.6 Seismic requirements. See Section 1905 for additional requirements for foundations of structures assigned to *Seismic Design Category* C, D, E or F.

For structures assigned to *Seismic Design Category* <u>C,</u> D, E or F, provisions of Section 18.13 of ACI 318 shall apply where not in conflict with the provisions of Sections 1808 through 1810.

~~Exceptions~~ <u>Exception</u>:

~~1.~~ Detached one- and two-family dwellings of *light-frame construction* and two stories or less above *grade plane* are not required to comply with the provisions of Section 18.13 of ACI 318.

~~2. Section 18.13.4.3(a) of ACI 318 shall not apply~~.

Reason: This proposal updates IBC requirements to provide consistency with ACI 318-19.
This provision is made applicable to Seismic Design Categories C through F to be consistent with ACI 318.

Exception 2 is deleted because both ACI 318 and IBC now require closely spaced ties for three pile diameters below the pile cap.

Cost Impact: The code change proposal will decrease the cost of construction
The proposal will reduce the cost of construction a very small amount by reducing the extent of closely spaced ties.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provides appropriate updates to be consistent with ACI 318-19. (Vote: 14-0)

Final Hearing Results

S162-22 AS

S163-22

Original Proposal

IBC: 1809.6

Proponents: Justin M. Spivey, Wiss, Janney, Elstner Associates, Inc., Self (jspivey@wje.com)

2021 International Building Code

Revise as follows:

1809.6 Location of footings. Footings on granular soil shall be so located that the line drawn between the lower edges of ~~adjoining~~ adjacent footings shall not have a slope steeper than 30 degrees (0.52 rad) with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported in an *approved* manner or a greater slope has been properly established by engineering analysis.

Reason: A distinction is needed between adjacent (Webster: close or near) and adjoining (Webster: touching or bounding at a point or line); adjoining is the more restrictive term as it requires contact. Especially in urban environments, *buildings* or non-building *structures* may separated by a public alley or otherwise close enough that demolition, excavation, or construction activities for one *building* or non-building *structure* may affect another without direct contact, i.e., adjacent but not adjoining. This and other related proposals being submitted in this cycle do not seek to address the numerous instances where adjacent and adjoining appear to be used interchangeably—most frequently in IBC Chapters 4, 7, 9, 10, and 23; instead, they seek to resolve inconsistent usage of adjacent and adjoining as a modifier of the words property, *structure*, *building*, and footing in IBC Chapters 18 and 33 and Appendix J and in IEBC Chapter 15.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not change the spirit of the provision, but changes the letter slightly. There is a chance the revised wording will curtail questionable or creative interpretations and thus increase initial cost, but to the extent it encourages proper protection of adjacent property, it will lower the risk of damage, reduce or eliminate the cost of repairs and/or litigation, and thereby decrease total cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the term 'adjacent' is more appropriate that the term 'adjoining' in section 1809.6. (Vote: 14-0)

Final Hearing Results

S163-22	AS

S165-22

Original Proposal

IBC: 1809.14 (New), 1810.3.12, ASCE/SEI Chapter 35 (New)

Proponents: Ronald LaPlante, Division of the State Architect, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Add new text as follows:

1809.14 Grade beams. Grade beams shall comply with the provisions of ACI 318.

Exception: Grade Beams not subject to differential settlement exceeding one-fourth of the thresholds specified in ASCE 7 Table 12.13-3 and designed to resist the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7 need not comply with ACI 318 Section 18.13.3.1.

Revise as follows:

1810.3.12 Grade beams. Grade beams shall comply with the provisions of ACI 318.

Exception: Grade beams not subject to differential settlement exceeding one-fourth of the thresholds specified in ASCE 7 Table 12.13-3 and designed to resist the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7need not comply with ACI 318 Section 18.13.3.1 .

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: The exception in IBC Section 1810.3.12 for grade beams in deep foundation systems is being modified as follows: 1) Clarify that it is only the ductile detailing provisions in ACI 318 Section 18.13.3.1 are exempt when the grade beams are designed for the overstrength factor and that all the other provision of ACI 318 are still applicable, such as durability, reinforcing steel cover, etc. 2) Further limit the exception to only be permissible when differential settlements are less than one-fourth of those in ASCE 7-22 Table 12.13-3 since ASCE 7-22 Section 12.13.9 exempts foundation elements from complying with deformation ductility requirements when they are less than this limit. This is needed to be clarified for deep foundation since ASCE 7-22 Section 12.13.9.3.1 permits downdrag of pile design to be based on significant differential settlement. Differential settlement exceeding this limit (one-fourth of those in ASCE 7 Table 12.13-3) may impose moments and shears in the grade beam that exceed those computed with the seismic load effects including overstrength factor, in which case the ductile detailing requirements for grade beams in ACI Section 18.13.3.1 would be required.
IBC Section 1809.14 is a new section to add the same grade beam provisions contained in the Deep Foundation Section 1810 to the Shallow Foundations Section 1809. The same provisions are applicable to both deep and shallow grade beam foundations.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal will not, in general, increase or decrease the overall cost of construction. These provisions provide alternatives and options for the designer to select the most economical approach to choose between ductile detailing (hoops and ties) or, perhaps, detai a larger foundation or more longitudinal reinforcement. For grade beams in deep foundations, this proposal limits the use of the exception to certain soil conditions which may have a slight cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adds needed criteria for grade beams for shallow foundations. (Vote: 14-0)

Final Hearing Results

S165-22	AS

S166-22

Original Proposal

IBC: 1810.2.2

Proponents: Daniel S. Stevenson, Berkel and Company, GeoCoalition; Lori Simpson, GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.2.2 Stability. *Deep foundation* elements shall be braced to provide lateral stability in all directions. Three or more elements connected by a rigid cap shall be considered to be braced, provided that the elements are located in radial directions from the centroid of the group not less than 60 degrees (1 rad) apart. A two-element group in a rigid cap shall be considered to be braced along the axis connecting the two elements. Methods used to brace *deep foundation* elements shall be subject to the approval of the *building official*.
Deep foundation elements supporting walls shall be placed alternately in lines spaced not less than 1 foot (305 mm) apart and located symmetrically under the center of gravity of the wall load carried, unless effective measures are taken to provide for eccentricity and lateral forces, or the foundation elements are adequately braced to provide for lateral stability.

Exceptions:

1. Isolated cast-in-place *deep foundation* elements without lateral bracing shall be permitted where the least horizontal dimension is not less than 2 feet (610 mm), adequate lateral support in accordance with Section 1810.2.1 is provided for the entire height and analysis demonstrates that the element can support the required loads, including mislocations required by Section 1810.3.1.3, with neither harmful distortion nor instability in the structure~~the height does not exceed 12 times the least horizontal dimension~~.
2. A single row of *deep foundation* elements without lateral bracing is permitted for one- and two-family dwellings and lightweight construction not exceeding two *stories above grade plane* or 35 feet (10 668 mm) in *building height*, provided that the centers of the elements are located within the width of the supported wall.

Reason:

- Element length (referred to in this code section as "height") alone is not an adequate indication of the need for deep foundation elements to be braced.
- Eliminating the 12 times the least horizontal dimension requirement will allow for greater economy by allowing for unbraced elements with greater lengths.
- Permitting elements to be unbraced based on length alone can result in unsafe conditions. Regardless of the element length, an analysis should be performed to determine if bracing is required. Research shows that shorter elements often have a greater need for bracing than longer elements. See attached white paper "Evaluating Lateral Bracing Code Requirements for Large Diameter Foundations", published by The Deep Foundations Institute (2021). The requirement to perform an analysis to determine if bracing is required will result in increased safety. Note the need for such an analysis is already implied by Section 1810.1.

https://www.cdpaccess.com/proposal/8661/25706/files/download/2945/

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal will decrease the cost of construction by not forcing the use of bracing where analysis shows that bracing is not required.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately adds the requirement for an analysis to use the exception. The committee noted that element height alone is not an adequate indication of the need for deep foundation elements to be braced. (Vote: 14-0)

Final Hearing Results

S166-22	AS

S167-22

Original Proposal

IBC: 1810.3.2.8

Proponents: Daniel S. Stevenson, Berkel and Company Contractors, Inc., GeoCoalition (dstevenson@berkelapg.com); Lori Simpson, GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.3.2.8 Justification of higher allowable stresses. Use of allowable stresses ~~greater than those specified in Section~~in Table 1810.3.2.6 that must be justified in accordance with this sectionshall be permitted where supporting data justifying such higher stresses is ~~filed with~~ submitted to and *approved* by the *building official*. Such substantiating data shall include the following:

1. A geotechnical investigation in accordance with Section 1803.
2. Load tests in accordance with Section 1810.3.3.1.2, regardless of the load supported by the element.

The design and installation of the deep foundation elements shall be under the direct supervision of a*registered design professional* knowledgeable in the field of soil mechanics and deep foundations who shall submit a report to the *building official* stating that the elements as installed satisfy the design criteria.

Reason:

- This section as currently written could override the allowable stresses in Table 1810.3.2.6 when a pile passes a load test.
- Table 1810.3.2.6 references Section 1810.3.2.8, and Table 1810.3.2.6 references Table 1810.3.2.6, thereby creating a circular reference. This proposal eliminates the circular reference.
- Several foundation types in Table 1810.3.2.6 have multiple allowable stresses for the same material type. For example, Table 1810.3.2.6 allows for an allowable compressive stress of 0.5Fy for steel piles when justified in accordance with 1810.3.2.8, and 0.35Fy otherwise. This proposal is intended to make this clear.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to clarify the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provides clarification and provides an appropriate direct pointer to Table 1810.3.2.6. The proposal correctly replaces 'filed with the building official' with 'submitted to and approved by the building official'. (Vote: 10-4)

Final Hearing Results

S167-22	AS

S168-22

Original Proposal

IBC: 1810.3.3.2

Proponents: Daniel S. Stevenson, Berkel and Company, GeoCoalition; Lori Simpson, GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.3.3.2 Allowable lateral load. Where required by the design, the lateral load capacity of a single *deep foundation* element or a group thereof shall be determined by an *approved* method of analysis or by lateral load tests to not less than twice the proposed design working *load*. The resulting allowable lateral *load* shall not be more than one-half of the*load* that produces a gross lateral movement of 1 inch (25 mm) at the lower of the top of the foundation element and the ground surface, unless it can be shown that the predicted lateral movement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any element to be loaded beyond its capacity. When piles are used in groups, group effects shall be evaluated in accordance with Section 1810.2.5.

Reason:

- In the second sentence, "allowable load" is revised to "allowable lateral load" to clarify that the subject is allowable lateral load, and not allowable axial load.
- When a load test is performed on a single foundation element, engineers may not realize that the results usually need to be adjusted for elements used in groups. A sentence was added to the end of this section to clarify that group effects still must be evaluated for foundation elements used in groups.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal only clarifies existing code requirements.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as the proposal's added pointer to Section 1810.2.5 may not be appropriate. (Vote: 11-3)

Public Comments

Public Comment 1

Proponents: Daniel S. Stevenson, Berkel and Company Contractors, Inc., GeoCoalition (dstevenson@berkelapg.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1810.3.3.2 Allowable lateral load. Where required by the design, the lateral load capacity of a single *deep foundation* element or a group thereof shall be determined by an *approved* method of analysis or by lateral load tests to not less than twice the proposed design working *load*. The resulting allowable lateral *load* shall not be more than one-half of the*load* that produces a gross lateral movement of 1 inch (25 mm) at the lower of the top of the foundation element and the ground surface, unless it can be shown that the predicted lateral movement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any element to be loaded beyond its capacity. ~~When piles are used in groups, group~~ Group effects shall be evaluated ~~in accordance with~~ where required by Section 1810.2.5.

Commenter's Reason: The language in the original proposal is problematic, as it says "...group effects shall be evaluated in accordance with section 1810.2.5." However, section 1810.2.5 does not say how to evaluate group effects. It only says where group effects must be evaluated. The proposed language has been revised to accurately reflect the requirements of 1810.2.5.
The added sentence is needed because many foundation designers fail to realize that group effects must be evaluated when determining the lateral capacity of deep foundation elements.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing code requirements.

Final Hearing Results

S168-22	AMPC1

S169-22

Original Proposal

IBC: 1810.3.8

Proponents: Ronald LaPlante, Division of State Architect, Federal Emergency Management Agency/Applied Technology Council -Seismic Code Support Committee (ron.laplante@dgs.ca.gov); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Building Code

Revise as follows:

1810.3.8 Precast concrete piles. Precast concrete piles shall be designed and detailed in accordance with ACI 318.

Exceptions:

1. For precast prestressed piles in *Seismic Design Category* C, the minimum volumetric ratio of spirals or circular hoops required by Section 18.13.5.10.4 of ACI 318 shall not apply in cases where the design includes full consideration of load combinations specified in ASCE 7, Section 2.3.6 or Section 2.4.5 and the applicable overstrength factor, Ω_0. In such cases, minimum transverse reinforcement index shall be as specified in Section 13.4.5.6 of ACI 318.
2. For precast prestressed piles in *Seismic Design Categories* D through F<u>and in Site Class A, B, BC, C, CD, D or DE sites</u>, the minimum volumetric ratio of spirals or circular hoops required by Section 18.13.5.10.5(c) of ACI 318 shall not apply in cases where the design includes full consideration of load combinations specified in ASCE 7, Section 2.3.6 or Section 2.4.5 and the applicable overstrength factor, Ω_0. In such cases, minimum transverse reinforcement shall be as specified in Section 13.4.5.6 of ACI 318.

Reason: Precast piles in Seismic Design Category D through F and in Site Class E or F sites may be subject to significant lateral deformations as a result of site soils that are either liquefiable or not considered competent to provide lateral support to the pile. Pile confinement reinforcement is required in these conditions to provide the necessary ductile performance where flexural yielding may occur because of these incompetent soils. The soil induced movements are capable of imposing moments and curvature on the piles that exceed those determined with the load combinations with overstrength factor. As a result, this proposal does not permit the use of exception #2 for Site Class E or F sites in Seismic Design Categories D through F. This proposal does not extend this restriction to exception #1 for sites in Seismic Design Category C due to the lower ground motion intensity at these sites. This change is consistent with IBC Section 1810.3.9.4.2.2 and ACI 318-19 Section 18.13.5.5 and Table 18.13.5.7.1 which require more ductile detailing in cast-in-place piles in Site Class E and F sites.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal may result in a small increase in construction cost for precast piles in foundations on Site Class E and F by requiring more confinement ties.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S169-22	AS

S170-22

Original Proposal

IBC: 1810.3.9.2

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

1810.3.9.2 Required reinforcement. Where subject to uplift or where the required moment strength determined using the load combinations of ASCE 7, Section 2.3 exceeds the design cracking moment determined in accordance with Section 1810.3.9.1 , cast-in-place deep foundations not enclosed by a structural steel pipe or tube shall be reinforced. <u>Where reinforcement is required it shall be in compliance with Chapter 20 of ACI 318.</u>

Reason: This proposal will provide requirements for what form reinforcement must take when it is required. Currently there are no requirements, especially for seismic design category A and B and it leads to the question of what is meant by reinforcement. Can it be bamboo, aluminum, wood, steel? What ASTMs shall reinforcement conform to? Can it be prestressed? What is the required cover to protect the reinforcement from corrosion?
ACI 318 is not applicable to most deep foundations, but the basic form that reinforcement takes, as already robustly explored in ACI 318, should be applicable.

ACI 318 Chapter 20 contains:

- Required material properties (ASTMs)
- Design properties (modulus of elasticity, calculation of yield strength)
- Durability requirements (cover, prestressing encasement)

Cost Impact: The code change proposal will increase the cost of construction
This proposal will restrict the types of reinforcement that can be considered "reinforcement".

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately fills a gap and provides the correct pointer to Chapter 20 of ACI 318. Some committee members felt that this is currently understood and therefor not required. (Vote: 11-3)

Final Hearing Results

S170-22	AS

S172-22

Original Proposal

IBC: 1810.4.5

Proponents: Daniel S. Stevenson, Berkel and Company, GeoCoalition (dstevenson@berkelapg.com); Lori Simpson, GeoCoalition (lsimpson@langan.com)

2021 International Building Code

Revise as follows:

1810.4.5 Vibratory driving. Vibratory drivers shall only be used to install *deep foundation* elements where the element load capacity is verified by load tests in accordance with Section 1810.3.3.1.2. ~~The installation of production elements shall be controlled according to power consumption, rate of penetration or other *approved* means that ensure element capacities equal or exceed those of the test elements.~~

Exceptions:

1. The pile installation is completed by driving with an impact hammer in accordance with Section 1810.3.3.1.1.
2. The pile is to be used only for lateral resistance.

<u>The installation of production elements shall be controlled according to power consumption, rate of penetration or other *approved* means that ensure element capacities equal or exceed those of the test elements.</u>

Reason: The second sentence (The installation of...) has been moved to after the exception, to clarify that the exception only applies to the first sentence and not the second sentence. The requirements for the installation of production piles that are contained in the second sentence should still be applicable, even if an exception is used.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies existing code requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies the intent and as per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S172-22 AS

S173-22

Original Proposal

IBC: 1901.2, SECTION 1907, 1907.1 (New), 1907.2 (New), 1907.1

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org)

2021 International Building Code

Revise as follows:

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code. ~~Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.~~

SECTION 1907
~~MINIMUM SLAB PROVISIONS~~ SLABS-ON-GROUND

Add new text as follows:

1907.1 General. Non-structural slabs-on-ground shall comply with Section 1904 and this Section. Structural slabs-on-ground shall comply with all applicable provisions of this Chapter. Slabs-on-ground shall be considered structural where designed to one of the following:

1. Transmit loads or resist lateral forces from other parts of the structure to the soil.
2. Transmit loads or resist lateral forces from other parts of the structure to foundations
3. Serve as tributary area for resisting uplift or overturning forces.

1907.2 Thickness. The thickness of concrete floor slabs supported directly on the ground shall be not less than 3½ inches (89 mm).

Revise as follows:

~~1907.1~~ 1907.3 ~~General~~ Vapor retarder. ~~The thickness of concrete floor slabs supported directly on the ground shall be not less than 3½ inches (89 mm).~~ A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other *approved* equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork that will not be enclosed at a later date.
5. Where *approved* based on local site conditions.

Reason: This proposal:

1. Renames Section 1907 to “Slabs-on-Ground” as this section is not applicable to interim floor slabs or other slabs not on ground.

2. Moves all slab-on-ground requirements into one section by eliminating text in section 1901.2

3. Clarifies scenarios where slabs-on-ground are structural, adding language that addresses slabs on ground used as part of a diaphragm systems, transferring loads to micro-piles, etc. and as dead weight to resist overturning or uplift forces.

4. The proposal divided the existing text of 1907.1 into two sections. 1907.2 for the thickness of concrete floor slabs and 1907.3 for Vapor retarder.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of the requirements

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as this proposal could setup a potential disconnect with ACI 318. The idea of 'vertical loads' should not be deleted. The committee did appreciate the concept of consolidating all the provisions for slabs-on-ground. (Vote: 9-5)

Public Comments

Public Comment 1

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code.

SECTION 1907
SLABS-ON-GROUND

1907.1 ~~General~~ Structural slabs-on-ground . ~~Non-structural slabs-on-ground shall comply with Section 1904 and this Section~~. Structural concrete slabs-on-ground shall comply with all applicable provisions of this Chapter. Slabs-on-ground shall be considered structural concrete where required by ACI 318 or where designed to: ~~one of the following:~~

1. Transmit vertical loads or ~~resist~~ lateral forces from other parts of the structure to the soil~~.~~ or
2. Transmit vertical loads or ~~resist~~ lateral forces from other parts of the structure to foundations
3. ~~Serve as tributary area for resisting uplift or overturning forces~~.

1907.2 Non-structural slabs on ground. Non-structural slabs-on-ground shall only be required to comply with Sections 1904.2, 1907.3, and 1907.4. Portions of the non-structural slabs on ground used to resist uplift forces or overturning shall be designed in accordance with accepted engineering practice throughout the entire portion designated as dead load to resist uplift forces or overturning.

~~1907.2~~ **1907.3 Thickness.** The thickness of concrete floor slabs supported directly on the ground shall be not less than 3½ inches (89 mm).

~~1907.3~~ **1907.4 Vapor retarder.** A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other *approved* equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork that will not be enclosed at a later date.
5. Where *approved* based on local site conditions.

Commenter's Reason: The committee expressed interest in having these concepts move forward in the code development process. The committee raised several concerns that are addressed in the public comment. In response to testimony the committee recommended four items be addressed:

1. The word “vertical” be inserted in front of “loads” in items 1 and 2.
2. Provides specific language referring to structural slabs as scoped by ACI 318.
3. Removes the word “resist” from item 1 and 2 to create a more logical sentence structure.

4. The committee thought the use of “tributary area” could create confusions and that the language in this public comment removes this item as a structural concrete designation and better describes portions of slabs used for deadweight to resist uplift or overturning where they are not structural concrete, but do need to be designed for whatever load effects need to be resisted that are induced from those applied uplift forces. These would frequently be bending and shear where the slab needs to cantilever beyond the face of the foundation below that is undergoing uplift.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This code change, as modified in the PC, is a clarification of the requirements for slab on ground and will not impact the cost of construction.

Final Hearing Results

S173-22	AMPC1

S174-22

Original Proposal

IBC: 1901.2, 1901.2.1 (New), ACI Chapter 35 (New), ASTM Chapter 35 (New)

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Jerzy Zemajtis, NEx, An ACI Center of Excellence for Nonmetallic Building Materials, NEx, An ACI Center of Excellence for Nonmetallic Building Materials (jerzy.zemajtis@nonmetallic.org); John Busel, American Composites Manufacturers Association, American Composites Manufacturers Association (jbusel@acmanet.org); Scott Campbell, NRMCA, NRMCA (scampbell@nrmca.org); Doug Gremel, Owens Corning Infrastructure Solutions, Owens Corning Infrastructure Solutions (douglas.gremel@owenscorning.com); Chuck Larosche, WJE, ACI (clarosche@wje.com); William O'Donnell, DeSimone Consulting Engineers, DeSimone Consulting Engineers (william.odonnell@de-simone.com); Matthew D'Ambrosia, MJ2 Consulting, MJ2 Consulting (matt@mj2consulting.com); Keith Kesner, CVM, CVM (kkesner3006@gmail.com); Antonio De Luca, Thornton Tomasetti, Thornton Tomasetti

2021 International Building Code

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code. Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.

Add new text as follows:

<u>**1901.2.1 Structural concrete with GFRP reinforcement.** Cast-in-place structural concrete internally reinforced with glass fiber reinforced polymer (GFRP) reinforcement conforming to ASTM D7957 and designed in accordance with ACI CODE 440 shall be permitted only for structures assigned to Seismic Design Category A.</u>

Add new standard(s) as follows:

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

<u>CODE 440-22</u>	<u>Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars - Code Requirements</u>

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>D7957/D7957M-17</u>	<u>Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement</u>

Reason: This proposal adds a new referenced standard: ACI CODE 440-22: *Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements.*

The addition of this new standard allows the design and construction of cast-in-place reinforced concrete using non-metallic reinforcement bars. Currently the design and construct requirements contained in the standard are limited to use in Seismic Design Category A. ACI Committee 440 developed this standard to provide for public health and safety by establishing minimum requirements for strength, stability, serviceability, durability, and integrity of GFRP reinforced concrete structures.

The standard not only provides a means of establishing minimum requirements for the design and construction of GFRP reinforced concrete, but for acceptance of design and construction of GFRP reinforced concrete structures by the building officials or their designated representatives.

The standard applies to GFRP reinforced concrete structures designed and constructed under the requirements of the general building code.

GFRP reinforced concrete is especially beneficial for satisfying a demand for improved resistance to corrosion in highly corrosive environments, such as reinforced concrete exposed to salt water, salt air, or de-icing salts.

This standard establishes minimum requirements for GFRP reinforced concrete in a similar fashion as ACI 318 Building Code Requirements for Structural Concrete establishes minimum requirements for structural concrete reinforced with steel reinforcement. A separate standard is needed, as GFRP reinforcement behaves differently than steel reinforcement.

Currently GFRP is accepted for use to reinforce highway bridge decks. Acceptance is primarily in areas where deicing salts are used on the roads and cause severe corrosion to conventional steel reinforcement. This proposed change provides minimum requirements for other applications where GFRP reinforced concrete is being considered, such as marine and coastal structures, parking garages, water tanks, and structures supporting MRI machines. Design reasons to use GFRP bars in structures are: resistance to corrosion in the presence of chloride ions, lack of interference with electromagnetic fields, and low thermal conductivity.

Currently the standard prohibits the use concrete internally reinforced with GFRP for applications where fire resistance ratings are required. Chapter 6 of the International Building code cites applications for floors, roofs, walls, partitions and primary and secondary structural frames where a fire resistance ratings are not required.

The code requirements may be viewed at:https://www.concrete.org/publications/standards/upcomingstandards.aspx

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds alternative materials for the design and construction of reinforced structural concrete in Seismic Design Category A and does not preclude the use of conventional reinforced concrete. Thus there is no cost impact.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as the proposed new standard, ACI Code 440-22, is not complete and was submitted in draft format only. The committee commented that testimony indicated the final version of the standard, ACI Code 440-22, may have substantive changes related to fire resistance of FRP. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); John Busel, American Composites Manufacturers Association, American Composites Manufacturers Association (jbusel@acmanet.org); Doug Gremel, Owens Corning Infrastructure Solutions, Owens Corning Infrastructure Solutions (douglas.gremel@owenscorning.com); Keith Kesner, CVM, CVM (kkesner3006@gmail.com); Antonio Nanni, University of Miami (nanni@miami.edu); William O'Donnell, DeSimone Consulting Engineers, DeSimone Consulting Engineers (william.odonnell@de-simone.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1901.2.1 Structural concrete with GFRP reinforcement. Cast-in-place structural concrete internally reinforced with glass fiber reinforced polymer (GFRP) reinforcement conforming to ASTM D7957 and designed in accordance with ACI CODE 440.11 shall be permitted where fire resistance ratings are not required and only for structures assigned to Seismic Design Category A.

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

CODE 440.11-22 Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars - Code Requirements

Commenter's Reason: The committee voted for disapproval for two reasons: 1) the ACI CODE 440.11 Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars - Code Requirements was in public review draft and 2) there was concern about application where fire resistance ratings are required. ACI CODE 440.11-22 has been completed and the revised designation is reflected in this pulbic comment. Further, this public comment adds clear language precluding design of structural concrete in accordance with ACI CODE 440.11 where fire resistance ratings are required. This public comment addresses both concerns expressed by the committee. There are many applications where the use of GFRP reinforcement in concrete can enhance durability and long term life safety.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal as modified with public comment provides an additional option for the design and consturction of reinforced structural concrete.

Final Hearing Results

S174-22	AMPC1

S175-22

Original Proposal

IBC: 1901.2, 1902.1, 1902.1.1, 1902.1.2, 1901.3, 1903.2, 1903.3, 1903.4, SECTION 1905, 1905.1, 1905.1.1, SECTION 202 (New), SECTION 202, 1905.1.2, 1905.1.3, 1905.1.4, 1905.3.1 (New), 1905.1.5, 1905.1.6, 1905.5.1 (New), 1905.1.7, 1905.6.1 (New), 1905.6.2 (New), 1905.1.8, 1905.7.1 (New), 1905.7.2 (New), ASCE/SEI Chapter 35 (New)

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); Kerry Sutton, American Concrete Institute, American Concrete Institute (kerry.sutton@concrete.org)

2021 International Building Code

Revise as follows:

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as ~~amended~~ supplemented in Section 1905 of this code. Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.

1902.1 General. Coordination of terminology used in ACI 318 and ASCE 7 shall be in accordance with Sections 1902.1.1~~and 1902.1.2~~.

1902.1.1 Design displacement . Design displacement shall be the Design Earthquake Displacement, δ_{DE}, defined in ASCE 7 Section 12.8.6.3. For diaphragms that can be idealized as rigid in accordance with ASCE 7 Section 12.3.1.2, δ_{di}, displacement due to diaphragm deformation corresponding to the design earthquake, is permitted to be taken as zero. ~~Design displacement at each level shall be the total lateral deflection at the level calculated for the design earthquake using the procedures defined in Section 12.8.6 of ASCE 7.~~

Delete without substitution:

~~**1902.1.2 Special structural wall.** Special structural walls made of cast-in-place or precast concrete shall comply with the requirements of Sections 18.2.4 through 18.2.8, 18.10 and 18.11 of ACI 318, as applicable, in addition to the requirements for *ordinary reinforced concrete structural walls* or *ordinary precast structural walls*, as applicable. Where ASCE 7 refers to a "special reinforced concrete shear wall," it shall be deemed to mean a "special structural wall."~~

Revise as follows:

1901.3 Anchoring to concrete. Anchoring to concrete shall be in accordance with ACI 318 as~~amended~~ supplemented in Section 1905, and applies to cast-in (headed bolts, headed studs and hooked J- or L-bolts), post-installed expansion (torque-controlled and displacement-controlled), undercut, screw, and adhesive anchors.

Delete without substitution:

~~**1903.2 Special inspections.** *Where required, special inspections and tests shall be in accordance with Chapter 17*~~*.*

Revise as follows:

1903.2 ~~**1903.3**~~ **Glass fiber-reinforced concrete.** *Glass fiber-reinforced concrete (GFRC) and the materials used in such concrete shall be in accordance with the PCI* ~~*MNL*~~ *128 s*~~*tandard*~~*.*

1903.3 ~~**1903.4**~~ **Flat wall insulating concrete form (ICF) systems.** Insulating concrete form material used for forming flat concrete walls shall conform to ASTM E2634.

SECTION 1905
SEISMIC REQUIREMENTS ~~MODIFICATIONS TO ACI 318~~

1905.1 General. In addition to the provisions of ACI 318, structural concrete shall comply with the requirements of Section 1905. ~~The text of ACI 318 shall be modified as indicated in Sections 1905.1.1 through 1905.1.8~~.

1905.2 ~~**1905.1.1**~~ **ACI 318, Section 23.** Modify existing definitions and add the following definitions to ACI 318, Section 2.3.

Add new definition as follows:

CAST-IN-PLACE CONCRETE EQUIVALENT DIAPHRAGM. A cast-in-place noncomposite topping slab diaphragm, as defined in Section 18.12.5, or a diaphragm constructed with precast concrete components that uses closure strips between precast components with detailing that meets the requirements of ACI 318 for the *Seismic Design Category* of the structure.

Revise as follows:

DETAILED PLAIN CONCRETE STRUCTURAL WALL. A wall complying with the requirements of Chapter 14, and Section 1905.5 of the *International Building Code* ~~including 14.6.2~~.

ORDINARY ~~**STRUCTURAL**~~ **PLAIN CONCRETE STRUCTURAL WALL.** A wall complying with the requirements of Chapter 14, *excluding 14.6.2.*

Add new definition as follows:

PRECAST CONCRETE DIAPHRAGM. A diaphragm constructed with precast concrete components, with or without a cast-in-place topping, that includes the use of discrete connectors or joint reinforcement to transmit diaphragm forces.

Delete without substitution:

~~**1905.1.2 ACI 318, Section 1821.** Modify ACI 318 Sections 18.2.1.2 and 18.2.1.6 to read as follows~~:

- ~~*18.2.1.2 – Structures assigned to Seismic Design Category* A shall satisfy requirements of Chapters 1 through 17 and 19 through 26; *Chapter 18 does not apply.* Structures assigned to *Seismic Design Category* B, C, D, E or F shall satisfy 18.2.1.3 through 18.2.1.7, as applicable. *Except for structural elements of plain concrete complying with Section 1905.1.7 of the International Building Code, structural elements of plain concrete are prohibited in structures assigned to Seismic Design Category C, D, E or F.*~~
- ~~18.2.1.6 - Structural systems designated as part of the *seismic force-resisting system* shall be restricted to those *permitted by ASCE 7.* Except for *Seismic Design Category* A, for which Chapter 18 does not apply, the following provisions shall be satisfied for each structural system designated as part of the *seismic force-resisting system*, regardless of the *seismic design category*:~~
  ~~(a) Ordinary moment frames shall satisfy 18.3.~~

  ~~(b) *Ordinary reinforced concrete structural walls and ordinary precast structural walls* need not satisfy any provisions in Chapter 18.~~

  ~~(c) Intermediate moment frames shall satisfy 18.4.~~

  ~~(d) Intermediate precast *structural* walls shall satisfy 18.5.~~

  ~~(e) Special moment frames shall satisfy 18.6 through 18.9.~~

  ~~(f) Special structural walls shall satisfy 18.10.~~

  ~~(g) Special structural walls constructed using precast concrete shall satisfy 18.11.~~

~~Special moment frames and special structural walls shall also satisfy 18.2.4 through 18.2.8~~.

Revise as follows:

1905.3 ~~**1905.1.3**~~ **Intermediate precast structural walls** ~~**ACI 318, Section 185.**~~ Intermediate precast structural walls shall comply with Section 18.5 of ACI 318 and this section.

~~Modify ACI 318, Section 18.5 by adding new Section 18.5.2.2 and renumbering existing Sections 18.5.2.2 and 18.5.2.3 to become 18.5.2.3 and 18.5.2.4, respectively.~~

- ~~*18.5.2.2 – Connections that are designed to yield shall be capable of maintaining 80 percent of theirdesign strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.*~~
- ~~18.5.2.3 – Elements of the connection that are not designed to yield shall develop at least 1.5S_y.~~
- ~~18.5.2.4 – In structures assigned to SDC D, E or F, wall piers shall be designed in accordance with 18.10.8 or 18.14 in ACI 318~~.

Delete without substitution:

~~**1905.1.4 ACI 318, Section 1811.** Modify ACI 318, Section 18.11.2.1 to read as follows~~:

- ~~18.11.2.1 – Special structural walls constructed using precast concrete shall satisfy all the requirements of 18.10*for cast-in-place special structural walls* in addition to 18.5.2~~.

Add new text as follows:

1905.3.1 Connections designed to yield. Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.

Revise as follows:

1905.4 ~~**1905.1.5**~~ **Foundations designed to resist earthquake forces** ~~**ACI 318, Section 181311.**~~ *Foundations resisting earthquake-induced forces or transferring earthquake-induced forces between a structure and ground shall comply with the requirements of 18.13 and other applicable provisions of* ACI 318 *unless modified by Chapter 18 of the* International Building Code.

~~Modify ACI 318, Section 18.13.1.1 to read as follows~~:

- ~~18.13.1.1 – *Foundations resisting earthquake-induced forces or transferring earthquake-induced forces between a structure and ground shall comply with the requirements of 18.13 and other applicable provisions of* ACI 318 *unless modified by Chapter 18 of the* International Building Code.~~

1905.5 ~~**1905.1.6**~~ **Detailed plain concrete structural walls** ~~**ACI 318, Section 146.**~~ Detailed plain concrete structural walls are walls conforming to the requirements of ordinary plain concrete structural walls and Section 1905.5.1 of the *International Building Code.* ~~Modify ACI 318, Section 14.6 by adding new Section 14.6.2 to read as follows:~~

- ~~*14.6.2 – Detailed plain concrete structural walls.*~~
- ~~*14.6.2.1 – Detailed plain concrete structural walls are walls conforming to the requirements ofordinary structural plain concrete walls and 14.6.2.2.*~~
- ~~*14.6.2.2 – Reinforcement shall be provided as follows*~~*:*
    - ~~(a) Vertical reinforcement of at least 0.20 square inch (129 mm²) in cross-sectional area shall be provided continuously from support to support at each corner, at each side of each opening and at the ends of walls. The continuous vertical bar required beside an opening is permitted to substitute for one of the two No. 5 bars required by 14.6.1.~~

    ~~*(b) Horizontal reinforcement at least 0.20 square inch (129 mm²) in cross-sectional area shall be provided: 1.Continuously at structurally connected roof and floor levels and at the top of walls.*~~

    ~~*2.At the bottom of load-bearing walls or in the top of foundations where doweled to the wall.*~~

    ~~*3.At a maximum spacing of 120 inches (3048 mm)*~~.

    ~~*Reinforcement at the top and bottom of openings, where used in determining the maximum spacing specified in Item 3 above, shall be continuous in the wall.*~~

Add new text as follows:

1905.5.1 Reinforcement. *Reinforcement shall be provided as follows:*

- Vertical reinforcement of at least 0.20 square inch (129 mm^2) in cross-sectional area shall be provided continuously from support to support at each corner, at each side of each opening, and at the ends of walls. The continuous vertical bar required beside an opening is permitted to substitute for one of the two No. 5 bars required by 14.6.1.
- *Horizontal reinforcement at least 0.20 square inch (129 mm^2) in cross-sectional area shall be provided:*
  1. *Continuously at structurally connected roof and floor levels and at the top of walls.*
  2. *At the bottom of load-bearing walls or in the top of foundations where doweled to the wall.*
  3. *At a maximum spacing of 120 inches (3048 mm).*

Reinforcement at the top and bottom of openings, where used in determining the maximum spacing specified in Item 3 above, shall be continuous in the wall.

Revise as follows:

1905.6 ~~**1905.1.7**~~ **Structural plain concrete** ~~**ACI 318, Section 1414.**~~ Structural plain concrete elements shall comply with this section in lieu of Section 14.1.4 of ACI 318. ~~Delete ACI 318, Section 14.1.4 and replace with the following~~:

- ~~*14.1.4 – Plain concrete in structures assigned to Seismic Design Category C, D, E or F.*~~
- ~~*14.1.4.1 – Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:*~~
  - ~~*Structural plain concrete basement, foundation or other walls below the base as defined in ASCE 7 are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall be not less than 7 1/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 14.6.1.*~~
  - ~~*Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.*~~

    ~~***Exception:** In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*~~
  - ~~*Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.*~~

    ~~**Exceptions:**~~

    1. ~~*In Seismic Design Categories A, B and C, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls are permitted to have plain concrete footings without longitudinal reinforcement.*~~
    2. ~~*For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*~~
    3. ~~*Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.*~~

Add new text as follows:

1905.6.1 Seismic Design Categories A and B. In structures assigned to Seismic Design Category A or B, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls are permitted to have plain concrete footings without longitudinal reinforcement.

1905.6.2 Seismic Design Categories C, D, E and F. *Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:*

- *Structural plain concrete basement, foundation or other walls below the base as defined in ASCE/SEI 7 are permitted in detached* *one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall be not less than 7$^1/_2$ inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 14.6.1.*

- *Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.*

  Exception: *In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*

- *Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.*

  Exceptions:

  1. *Where assigned to Seismic Design Category C, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls are permitted to have plain concrete footings without longitudinal reinforcement.*
  2. *For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*
  3. *Footings cast* monolithically *with a slab-on-ground shall have not fewer than one No. 4 bar at the top and bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth.*

Revise as follows:

1905.7 ~~**1905.1.8**~~ **Design requirements for anchors** ~~**ACI 318, Section 1723.** Modify ACI 318 Sections 17.10.5.2, 17.10.5.3(d) and 17.10.6.2 to read as follows:~~

- ~~17.10.5.2 – *Where* the tensile component of the strength-level earthquake force applied to anchors exceeds 20 percent of the total factored anchor tensile force associated with the same load combination, anchors and their attachments shall be designed in accordance with 17.10.5.3. The anchor design tensile strength shall be determined in accordance with 17.10.5.4.~~

  ~~**Exception:** *Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 shall be deemed to satisfy Section 17.10.5.3(d).*~~

- ~~17.10.5.3(d) – *The* anchor or group *of anchors* shall be designed for the maximum tension obtained from design load combinations that include **E**, with **E** increased by Ω_0. The anchor design tensile strength shall *be calculated from 17.10.5.4.*~~
- ~~17.10.6.2 – *Where* the shear component of the strength-level earthquake force applied to anchors exceeds 20 percent of the total factored anchor shear force associated with the same load combination, anchors and their attachments shall be designed in accordance with 17.10.6.3. The anchor design shear strength for resisting earthquake forces shall be determined in accordance with 17.7.~~

  ~~**Exceptions:**~~

~~*1. For the calculation of the in-plane shear strength of anchor bolts attaching wood sill plates of bearing or nonbearing walls of light-frame wood structures to foundations or foundation stem walls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 shall be deemed to be satisfied provided all of the following are met:*~~

~~*1.1. The allowable in-plane shear strength of the anchor is determined in accordance with ANSI/AWC NDS Table 12E for lateral design values parallel to grain.*~~

~~*1.2. The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).*~~

~~*1.3. Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).*~~

~~*1.4. Anchor bolts are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.*~~

~~*1.5. Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.*~~

~~*1.6. The sill plate is 2-inch (51 mm) or 3-inch (76 mm) nominal thickness.*~~

~~*2. For the calculation of the in-plane shear strength of anchor bolts attaching cold-formed steel track of bearing or nonbearing walls of light-frame construction to foundations or foundation stem walls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 shall be deemed to be satisfied provided all of the following are met:*~~
~~*Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete, shall be permitted to be determined in accordance with AISI S100 Section J3.3.1.*~~

~~*2.1. The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).*~~

~~*2.2. Anchors are embedded into concrete a minimum of 7 inches (178 mm).*~~

~~*2.3. Anchors are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the track.*~~

~~*2.4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.*~~

~~*2.5. The track is 33 to 68 mil (0.84 mm to 1.73 mm) designation thickness.*~~

~~*3. In light-frame construction bearing or nonbearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter attaching sill plate or track to foundation or foundation stem wall need not satisfy 17.10.6.3(a) through (c) when the design strength of the anchors is determined in accordance with 17.7.2.1(c).*~~

Add new text as follows:

1905.7.1 Anchors in tension. The following exception is permitted to ACI 318 Section 17.10.5.2:

Exception: Anchors designed to resist wall out-of-plane forces with *design strengths* equal to or greater than the force determined in accordance with ASCE/SEI 7 equation 12.11-1 or 12.14-1 shall be deemed to satisfy Section 17.10.5.3(d) of ACI 318.

1905.7.2 Anchors in shear. The following exceptions are permitted to ACI 318 Section 17.10.6.2:

Exceptions:

1. *For the calculation of the in-plane shear strength of anchor bolts attaching wood sill plates of bearing or nonbearing walls of light-frame wood structures to foundations or foundation stemwalls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 of ACI 318 shall be deemed to be satisfied provided all of the following are met:*
    1.1. *The allowable in-plane shear strength of the anchor is determined in accordance with ANSI/AWC NDS Table 12E for lateral design values parallel to grain.*
    1.2. *The maximum anchor nominal diameter is 5/8 inch (16 mm).*
    1.3. *Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).*
    1.4. *Anchor bolts are located a minimum of 1 3/4 inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.*
    1.5. *Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.*
    1.6. *The sill plate is 2-inch (51 mm) or 3-inch (76 mm) nominal thickness.*

2. *For the calculation of the in-plane shear strength of anchor bolts attaching cold-formed steel track of bearing or nonbearing walls of light-frame construction to foundations or foundation stemwalls, the in-plane shear strength in accordance with 17.7.2 and 17.7.3 need not be computed and 17.10.6.3 shall be deemed to be satisfied provided all of the following are met: Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete, shall be permitted to be determined in accordance with AISI S100 Section J3.3.1.*
    2.1. *The maximum anchor nominal diameter is 5/8 inch (16 mm).*
    2.2. *Anchors are embedded into concrete a minimum of 7 inches (178 mm).*
    2.3. *Anchors are located a minimum of 1 3/4 inches (45 mm) from the edge of the concrete parallel to the length of the track.*
    2.4. *Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.*
    2.5. *The track is 33 to 68 mil (0.84 mm to 1.73 mm) designation thickness.*
3. *In light-frame construction bearing or nonbearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter attaching sill plate or track to foundation or foundation stemwalls need not satisfy 17.10.6.3(a) through (c) when the design strength of the anchors is determined in accordance with 17.7.2.1(c).*

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal makes a conceptual change in Section 1905, without introducing any substantive change. The section is reformatted so that, instead of amending certain sections of ACI 318 19, it contains provisions that are supplemental to those of ACI 318-19 The new format is believed to be more user-friendly. As part of this format change existing provisions have been relocated to the following new subsections: 1905.3.1, 1905.5.1, 1905.6.1, 1905.7.1, and 1905.7.2.
1901.2, 1901.3 - The changes reflect the conceptual change in section 1905.

1902.1 - The two existing subsections are deleted as being unnecessary. The new Subsection 1902.1 .1 is added in view of the introduction of Design Earthquake displacement in ACE 7-22, which includes diaphragm displacement under the Design Earthquake. To avoid unnecessary calculations, the latter is permitted to be taken equal to zero for diaphragms that can be idealized as rigid.

1903.2 (old numbering) - This section is deleted because it is a repeat of Section 1901.6.

1903.2 - This is essentially the correction of an error. The 2021 IBC already refers to PCI 128-19*Specification for Glass Fiber Reinforced Concrete Panels* in chapter 35. However, Section 1903.3, now 1903.2. still refers to the old PCI MNL 128, which was a recommended practice document, not a standard.

1905.1 - The language implements the conceptual change made to Section 1905

1905.2 - The two new definitions are introduced because they have been added to Chapter 14 of ASCE 7-22, which will not be adopted by the 2024 IBC.

1905.1 .2 (old numbering) - This is deleted as being unnecessary.

1905.3 - Deletions and additions implement the conceptual change made to Section 1905.

1905.1 .4 (old numbering) - This is deleted as being unnecessary.

1905.4 - Additions and deletions implement the conceptual change made to Section 1905

1905.5 - Additions and deletions implement the conceptual change made to Section 1905. The remaining text of 1905.5 is improved for ease of use.

1905.6 - In addition to reflecting the conceptual change mentioned above, changes have been made to correct a structural problem with the existing section. The section is applicable to SDC C, D, E, and F structures. Yet, there is an exception made for SDC A, B structures. This has now been straightened out.

1905.7 - In addition to implementing the conceptual change made to Section 1905, much unnecessary text is deleted to produce a much more streamlined section.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No substantive change has been made in the entire chapter.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal cleans up the language and flow of the requirements. The committee recommended that the proposal could benefit from updates to clarify the pointers to ACI 318 and updating of the charging language. (Vote: 14-0)

Final Hearing Results

S175-22	AS

S181-22

Original Proposal

IBC: CHAPTER 21, SECTION 2102, 2102.1, 2107.2.1, 2109.2.1.2.4

Proponents: Phillip Samblanet, The Masonry Society, The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, National Concrete Masonry Association, Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

CHAPTER 21 MASONRY

SECTION 2102
NOTATIONS

Revise as follows:

2102.1 General. The following notations are used in the chapter:

NOTATIONS.

d_b	=	Diameter of reinforcement, inches (mm).
F_s	=	Allowable tensile or compressive stress in reinforcement, psi (MPa).
f_r	=	Modulus of rupture, psi (MPa).
f_s ~~f'_{AAC}~~	= =	Computed stress in reinforcement due to design loads, psi (MPa) ~~Specified compressive strength of *AAC masonry*, the minimum compressive strength for a class of *AAC masonry* as specified in TMS 602 , psi (MPa).~~
f'_m	=	~~*Specified compressive strength of masonry* at age of 28 days, psi (MPa)~~.
f'_{mi}	=	~~*Specified compressive strength of masonry* at the time of prestress transfer, psi (MPa)~~.
~~K~~	=	~~The lesser of the masonry cover, clear spacing between adjacent reinforcement, or five times~~ d_b, inches (mm).
L_s	=	Distance between supports, inches (mm).
l_d	=	Required development length or lap length of reinforcement, inches (mm).
P	=	The applied *load* at failure, pounds (N).
S_t	=	Thickness of the test specimen measured parallel to the direction of *load*, inches (mm).
S_w	=	Width of the test specimen measured parallel to the loading cylinder, inches (mm).

2107.2.1 Lap splices.

The minimum length of lap splices for reinforcing bars in tension or compression, l_d, shall be:

$$l_d = 0.002 d_b f_s$$

For SI: $l_d = 0.29 d_b f_s$

but not less than 12 inches (305 mm). The length of the lapped splice shall be not less than 40 bar diameters.

~~where :~~

~~d_b = Diameter of reinforcement, inches (mm).~~

~~f_s = Computed stress in reinforcement due to design loads, psi (MPa).~~

In regions of moment where the design tensile stresses in the reinforcement are greater than 80 percent of ~~the allowable steel tension stress,~~ F_s, the lap length of splices shall be increased not less than 50 percent of the minimum required length, but need not be greater than

72 d_b. Other equivalent means of stress transfer to accomplish the same 50 percent increase shall be permitted. Where epoxy coated bars are used, lap length shall be increased by 50 percent.

2109.2.1.2.4 Modulus of rupture determination. The modulus of rupture shall be determined by the equation:

$f_r = 3\ PL_s /[2\ S_w\ (S_t^2)]$ **(Equation 21-2)**

~~where, for the purposes of this section only~~:

~~S_w = Width of the test specimen measured parallel to the loading cylinder, inches (mm).~~

~~f_r = Modulus of rupture, psi (MPa)~~.

~~L_s = Distance between supports, inches (mm).~~

~~S_t = Thickness of the test specimen measured parallel to the direction of load, inches (mm).~~

~~P = The applied *load* at failure, pounds (N)~~.

Reason: In an effort to delete redundant and unneeded content to keep the provisions as short and direct as possible, a number of minor changes are being proposed. The Notation shown deleted in Section 2102 no longer appear in this Chapter, nor could the proponent find them in the IBC. They are used by referenced standards and are defined in those standards. But since they no longer appear to be used directly in the IBC, they should be deleted for clarity.
The term fs is defined in 2107.2, but not in this section, so it is proposed moving that notation to 2102.

Other terms are defined both in 2102, and in 2017.2 and in 2109. The redundant definitions are proposed to be deleted in 2107.2 and 2109.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change would simply delete unneeded or redundant notation. As such, there is no construction cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provided a needed clean-up of the notation in section 2102. (Vote: 11-2)

Final Hearing Results

S181-22 AS

S182-22

Original Proposal

IBC: 2103.2.4, TMS Chapter 35 (New)

Proponents: Phillip Samblanet, The Masonry Society, The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, National Concrete Masonry Association, Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2103.2.4 Mortar for adhered masonry veneer. *Mortar* for use with *adhered masonry veneer* shall conform to <u>Section 13.3 of TMS 402</u>. ~~ASTM C270 for Type N or S, or shall comply with ANSI A118.4 for latex-modified Portland cement *mortar*.~~

Add new standard(s) as follows:

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501-6172

<u>402-22</u> <u>Building Code Requirements for Masonry Structures</u>

Reason: Provisions for adhered veneer have been extensively discussed and updated in the 2022 TMS 402 to be more rationally based using a minimum mortar/unit bond strength value. This change updates the mortar requirements to comply with those provisions. Setting bed mortars are required by TMS 402/602-22 to be latex-modified mortars complying with ANSI A118.4 or A118.15 due to their increased bond strength. Setting bed mortars meeting ASTM C270 Type N or S are only permitted when testing is conducted on the specific mortar/unit combination to be used in construction.

Cost Impact: The code change proposal will increase the cost of construction
This change updates requirements for mortar for adhered masonry veneer. In most cases, because these mortars are currently used and required, there is no increase in the cost of construction. For some construction, there could be a minor increase in the cost of mortar used for these systems to achieve better performance.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as TMS 402-22 covers the requirements for mortar. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: CP28 administration

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change.This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard TMS 402-22 must be completed and readily

available prior to the Public Comment Hearing in order for this public comment to be considered.
(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
N/A

Final Hearing Results

S182-22	AS

S183-22

Original Proposal

IBC: 2107.2, 2107.2.1, 2107.3, 2108.2, 2108.3, TMS Chapter 35 (New)

Proponents: Phillip Samblanet, The Masonry Society, The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, National Concrete Masonry Association, Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2107.2 TMS 402, Section ~~61611~~6.1.7.1, lap splices. As an alternative to Section ~~6.1.6.1.1~~6.1.7.1, it shall be permitted to design lap splices in accordance with Section 2107.2.1.

2107.2.1 Lap splices.
The minimum length of lap splices for reinforcing bars in tension or compression, l_d, shall be:

$$l_d = 0.002 d_b f_s$$

For SI: $l_d = 0.29 d_b f_s$

but not less than 12 inches (305 mm). The length of the lapped splice shall be not less than 40 bar diameters.

~~where :~~

~~d_b = Diameter of reinforcement, inches (mm).~~

~~f_s = Computed stress in reinforcement due to design loads, psi (MPa).~~

In regions of moment where the design tensile stresses in the reinforcement are greater than 80 percent of ~~the allowable steel tension stress,~~ F_s, the lap length of splices shall be increased not less than 50 percent of the minimum required length, but need not be greater than 72 d_b. Other equivalent means of stress transfer to accomplish the same 50 percent increase shall be permitted. Where epoxy coated bars are used, lap length shall be increased by 50 percent.

2107.3 TMS 402, Section ~~6161~~6.1.7, splices of reinforcement. Add to ~~Modify~~ Section ~~6.1.6.1~~6.1.7 as follows:

- ~~6.1.6.1~~ 6.1.7- Splices of reinforcement. Lap splices, welded splices or mechanical splices are permitted in accordance with the provisions of this section. Welding shall conform to AWS D1.4. Welded splices shall be of ASTM A706 steel reinforcement. Reinforcement larger than No. 9 (M #29) shall be spliced using mechanical connections in accordance with Section ~~6.1.6.1.3~~ 6.1.7.2.

2108.2 TMS 402, Section ~~61511~~6.1.6, development. ~~Modify~~Add a ~~the~~ second paragraph ~~of~~ Section 6.1.6.3.1~~6.1.5.1.1~~ as follows:
The required development length of reinforcement ~~shall be determined by Equation (6-1), but shall be not less than 12 inches (305 mm) and~~ need not be greater than 72d_b.

2108.3 TMS 402, Section 61611, splices. ~~Modify~~Add to Sections ~~6.1.6.1.2 and 6.1.6.1.3~~6.1.7.2.1 and 6.1.7.3.1 as follows:

- ~~6.1.6.1.2~~6.1.7.3.1 – ~~A welded splice shall have the bars butted and welded to develop not less than 125 percent of the yield strength, f_y, of the bar in tension or compression, as required. Welded splices shall be of ASTM A706 steel reinforcement.~~ Welded splices shall not be permitted in plastic hinge zones of intermediate or special reinforced walls.
- ~~6.1.6.1.3~~6.1.7.2.1 – Mechanical splices shall be classified as Type 1 or 2 in accordance with Section 18.2.7.1 of ACI 318. Type 1 mechanical splices shall not be used within a plastic hinge zone or within a beam-column joint of intermediate or special *reinforced masonry* shear walls. Type 2 mechanical splices are permitted in any location within a member.

Add new standard(s) as follows:

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501-6172

402-22 Building Code Requirements for Masonry Structures

Reason: The cited references have been moved. In addition, some of the requirements shown to be deleted are now included in TMS 402, and are thus no longer required in the IBC directly (as they would be redundant). No technical changes have been proposed in this change. The intent is just to update references and to remove redundancy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply deletes redundant requirements and updates references. As such, there is no impact on construction costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal brings needed clarity and removes redundancy items for the IBC. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: CP28 administration

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change.This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard TMS 402-22 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.
(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
N/A

Final Hearing Results

S183-22	AS

S185-22

Original Proposal

IBC: 2109.1.1

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

2109.1.1 Limitations. The use of empirical design of adobe masonry shall be limited as noted in Section A.1.2 of TMS 402. In buildings that exceed one or more of the limitations of Section A.1.2 of TMS 402, masonry shall be designed in accordance with the engineered design provisions of Section 2101.2 or the foundation wall provisions of Section 1807.1.5.
Section ~~A.1.2.2~~ A.1.2.3 of TMS 402 shall be modified as follows:

- ~~A.1.2.2~~ A.1.2.3 – *Wind*. Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where V_{asd} as determined in accordance with Section 1609.3.1 of the *International Building Code* exceeds 110 mph.

Reason: This code change proposal corrects what appears to be a longstanding typographical error. As the code currently stands the seismic section of TMS 402 Appendix A is eliminated and states wind limitations twice in A1.2.2 and A1.2.3.
There are those who assume this is not a typographical error, but an attempt to completely undo the TMS 402 seismic requirements of Appendix A in the IBC. This is not the case. TMS 402 is specific about what SDCs are allowed and in what capacities.

Cost Impact: The code change proposal will increase the cost of construction
Depending on one's current interpretation of the typographical error this will either have no impact or will restrict adobe masonry to only certain situations in certain SDCs.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as the proposal is no longer needed as adobe has been removed from TMS 402. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Ben Loescher, Architect, The Earthbuilders' Guild (bloescher@lmarchitectsinc.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com); Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com) requests As Submitted

Commenter's Reason: This Proposal was not approved in the Committee Action Hearings after Proposal S144-22 was approved. Reconsideration is necessitated by Public Comment related to that item.

The current language of Section 2109.1.1 includes what appears to be a longstanding typographical error which incorrectly indicates A1.2.2 for provisions related to Wind; the correct citation for Wind in TMS 402 Appendix A is A1.2.3; A1.2.2 is the reference for Seismic.

Without this correction, the reader may incorrectly conclude that Empirical Design of Adobe Masonry is permitted in highly seismic areas (Seismic Design D, E & F) where that design approach is inappropriate.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The this code change will clarify the restriction on the use of empirically designed adobe masonry to specific lower seismic risk areas, and as a result may increase the cost of construction.

Final Hearing Results

S185-22	AS

S187-22

Original Proposal

IBC: CHAPTER 22, SECTION 2201, 2201.1, 2201.2 (New), 2201.3 (New), 2201.4 (New), 2201.5 (New), SECTION 2202, 2202.1, SECTION 2203, 2203.1, SECTION 2204, 2204.1, 2204.2, 2204.3, SECTION 2205, 2205.1, 2205.2, 2205.2.1, 2205.2.1.1, 2205.2.1.2, 2205.2.2, SECTION 2206, 2206.1, 2206.2, 2206.2.1, 2203 (New), 2203.1 (New), SECTION 2210, 2210.1, 2210.2, 2204.2.1 (New), 2204.2.2 (New), 2205 (New), 2205.1 (New), SECTION 2211, 2211.1, 2211.1.1, 2211.1.1.1, 2211.1.1.2, 2211.1.2, 2211.1.3, 2211.1.3.1, 2211.1.3.2, 2211.1.3.3, 2211.2, 2207 (New), 2210.1.1, 2210.1.1.1, 2210.1.1.2, 2210.1.1.3, SECTION 2207, 2207.1, 2207.1.1, 2207.2, 2207.3, 2207.4, 2207.5, SECTION 2209, 2209.1, 2209.2, 2209.3, SECTION 2208, 2208.1, AISC Chapter 35 (New), AISI Chapter 35 (New)

Proponents: Jon-Paul Cardin, American Iron and Steel Institute, American Iron and Steel Institute (jcardin@steel.org)

2021 International Building Code

CHAPTER 22 STEEL

SECTION 2201
GENERAL

2201.1 Scope. The provisions of this chapter govern the quality, design, fabrication and erection of steel construction.

Add new text as follows:

2201.2 Identification. Identification of steel members shall be in accordance with the applicable reference standards within this chapter. Other steel furnished for structural load-carrying purposes shall be identified for conformity to the ordered grade in accordance with the specified ASTM standard or other specification and the provisions of this chapter. Where the steel grade is not readily identifiable from marking and test records, the steel shall be tested to verify conformity to such standards.

2201.3 Protection. The protection of steel members shall be in accordance with the applicable reference standards within this chapter.

2201.4 Connections. The design and installation of steel connections shall be in accordance with the applicable reference standards within this chapter. For *special inspection* of welding or installation of high-strength bolts, see Section 1705.2.

2201.5 Anchor Rods. Anchor rods shall be set in accordance with the*approved construction documents.* The protrusion of the threaded ends through the connected material shall fully engage the threads of the nuts, but shall not be greater than the length of the threads on the bolts.

Delete without substitution:

~~SECTION 2202~~
~~IDENTIFICATION OF STEEL FOR STRUCTURAL PURPOSES~~

~~**2202.1 General.** Identification of *structural steel elements* shall be in accordance with AISC 360. Identification of cold-formed steel members shall be in accordance with AISI S100. Identification of cold-formed steel *light-frame construction* shall also comply with the requirements contained in AISI S240 or AISI S220, as applicable. Other steel furnished for structural load-carrying purposes shall be properly identified for conformity to the ordered grade in accordance with the specified ASTM standard or other specification and the provisions of this chapter. Where the steel grade is not readily identifiable from marking and test records, the steel shall be tested to verify conformity to such standards.~~

~~SECTION 2203~~
~~PROTECTION OF STEEL FOR STRUCTURAL PURPOSES~~

~~**2203.1 General.** Painting of *structural steel elements* shall be in accordance with AISC 360. Painting of open-web steel joists and joist girders shall be in accordance with SJI 100 and SJI 200. Individual structural members and assembled panels of *cold-formed steel construction* shall be protected against corrosion in accordance with the requirements contained in AISI S100. Protection of cold-formed steel *light-frame construction* shall be in accordance with AISI S240 or AISI S220, as applicable~~.

~~SECTION 2204~~
~~CONNECTIONS~~

~~**2204.1 Welding.** The details of design, workmanship and technique for welding and qualification of welding personnel shall be in accordance with the specifications listed in Sections 2205, 2206, 2207, 2208, 2210 and 2211. For *special inspection* of welding, see Section 1705.2.~~

~~**2204.2 Bolting.** The design, installation and inspection of bolts shall be in accordance with the requirements of Sections 2205, 2206, 2207, 2210 and 2211. For *special inspection* of the installation of high-strength bolts, see Section 1705.2~~.

~~**2204.3 Anchor rods.** Anchor rods shall be set in accordance with the *approved construction documents*~~. ~~The protrusion of the threaded ends through the connected material shall fully engage the threads of the nuts but shall not be greater than the length of the threads on the bolts.~~

Revise as follows:

SECTION ~~2205~~2202
STRUCTURAL STEEL AND COMPOSITE STRUCTURAL STEEL AND CONCRETE

~~2205.1~~ 2202.1 General. The design, fabrication and erection of *structural steel elements* and composite structural steel and concrete elements in buildings, structures and portions thereof shall be in accordance with AISC 360.

~~2205.2~~2202.2 Seismic design. Where required, the seismic design, fabrication and erection of buildings, structures and portions thereof shall be in accordance with Section ~~2205.2.1~~2202.2.1 or ~~2205.2.2~~2202.2.2, as applicable.

~~2205.2.1~~2202.2.1 Structural steel seismic force-resisting systems and composite structural steel and concrete seismic force-resisting systems. The design, detailing, fabrication and erection of structural steel *seismic force-resisting systems* and composite structural steel and concrete *seismic force-resisting systems* shall be in accordance with the provisions of Section ~~2205.2.1.1~~2202.2.1.1 or ~~2205.2.1.2~~2202.2.1.2, as applicable.

~~2205.2.1.1~~2202.2.1.1 Seismic Design Category B or C. Structures assigned to *Seismic Design Category* B or C shall be of any construction permitted in Section ~~2205~~2202. Where a response modification coefficient, *R*, in accordance with ASCE 7, Table 12.2-1, is used for the design of structures assigned to *Seismic Design Category* B or C, the structures shall be designed and detailed in accordance with the requirements of AISC 341. Beam-to-column moment connections in structural steel special moment frames and intermediate moment frames shall be prequalified in accordance with AISC 341, Section K1, qualified by testing in accordance with AISC 341, Section K2, or shall be prequalified in accordance with AISC 358.

> **Exception:** The response modification coefficient, *R*, designated for “Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems” in ASCE 7, Table 12.2-1, shall be permitted for structural steel systems designed and detailed in accordance with AISC 360, and need not be designed and detailed in accordance with AISC 341.

~~2205.2.1.2~~2202.2.1.2 Seismic Design Category D, E or F. Structures assigned to *Seismic Design Category* D, E or F shall be designed and detailed in accordance with AISC 341, except as permitted in ASCE 7, Table 15.4-1. Beam-to-column moment connections in structural steel special moment frames and intermediate moment frames shall be prequalified in accordance with AISC 341, Section K1, qualified by testing in accordance with AISC 341, Section K2, or shall be prequalified in accordance with AISC 358.

~~2205.2.2~~2202.2.2 Structural steel elements. The design, detailing, fabrication and erection of *structural steel elements* in *seismic force-resisting systems* other than those covered in Section ~~2205.2.1~~2202.2.1, including struts, *collectors*, chords and foundation elements, shall be in accordance with AISC 341 where either of the following applies:

1. The structure is assigned to *Seismic Design Category* D, E or F, except as permitted in ASCE 7, Table 15.4-1.
2. A response modification coefficient, R, greater than 3 in accordance with ASCE 7, Table 12.2-1, is used for the design of the structure assigned to *Seismic Design Category* B or C.

Delete without substitution:

~~SECTION 2206~~
~~COMPOSITE STRUCTURAL STEEL AND CONCRETE STRUCTURES~~

~~**2206.1 General.** Systems of *structural steel elements* acting compositely with reinforced concrete shall be designed in accordance with AISC 360 and ACI 318, excluding ACI 318 Chapter 14.~~

~~**2206.2 Seismic design.** Where required, the seismic design, fabrication and erection of composite steel and concrete systems shall be in accordance with Section 2206.2.1.~~

~~**2206.2.1 Seismic requirements for composite structural steel and concrete construction.** Where a response modification coefficient, *R*, in accordance with ASCE 7, Table 12.2-1, is used for the design of systems of structural steel acting compositely with reinforced concrete, the structures shall be designed and detailed in accordance with the requirements of AISC 341.~~

Add new text as follows:

2203
STRUCTURAL STAINLESS STEEL

2203.1 General. The design, fabrication, and erection of austenitic and duplex structural stainless steel shall be in accordance with AISC 370.

Revise as follows:

SECTION ~~2210~~2204
COLD-FORMED STEEL

~~2210.1~~2204.1 General. The design of cold-formed carbon and low-alloy steel structural members not covered in Sections 2206 through 2209 of this chapter shall be in accordance with AISI S100.~~The design of cold-formed stainless-steel structural members shall be in accordance with ASCE 8. Cold-formed steel *light-frame construction* shall comply with Section 2211.~~ The design of cold-formed steel diaphragms shall be in accordance with additional provisions of AISI S310 as applicable. Where required, the seismic design of cold-formed steel structures shall be in accordance with the additional provisions of Section ~~2210.2~~2204.2.

~~2210.2~~2204.2 Seismic design ~~requirements for cold-formed steel structures~~. The design and detailing of cold-formed steel seismic force-resisting systems shall be in accordance with Section 2204.2.1 and 2204.2.2 as applicable.~~Where a response modification coefficient, R, in accordance with ASCE 7, Table 12.2-1, is used for the design of cold-formed steel structures, the structures shall be designed and~~

~~detailed in accordance with the requirements of AISI S100, ASCE 8, or, for cold-formed steel special-bolted moment frames, AISI S400.~~

Add new text as follows:

2204.2.1 CFS Special Bolted Moment Frames. Where a response modification coefficient, R, in accordance with ASCE 7, Table 12.2-1, is used for the design of cold-formed steel special bolted moment frames, the structures shall be designed and detailed in accordance with the requirements of AISI S400.

2204.2.2 Cold-formed steel seismic force resisting systems. The response modification coefficient, R, designated for "Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems" in ASCE 7, Table 12.2-1, shall be permitted for systems designed and detailed in accordance with AISI S100 and need not be designed and detailed in accordance with AISI S400.

2205
COLD-FORMED STAINLESS STEEL

2205.1 General. The design of cold-formed stainless steel structural members shall be in accordance with ASCE 8.

Revise as follows:

SECTION ~~2211~~2206
COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION

~~2211.1~~2206.1 Structural framing systems. For cold-formed steel *light-frame construction*, the design and installation of the following structural framing systems, including their members and connections, shall be in accordance with AISI S240, and Sections ~~2211.1.1~~ 2206.1.1 through ~~2211.1.3~~2206.1.3, as applicable:

1. Floor and roof systems.
2. Structural walls.
3. Shear walls, strap-braced walls and diaphragms that resist in-plane lateral loads.
4. Trusses.

~~2211.1.1~~2206.1.1 Seismic design ~~requirements for cold-formed steel structural systems~~. The design of cold-formed steel *light-frame construction* to resist seismic forces shall be in accordance with the provisions of Section~~2211.1.1.1~~2206.1.1.1 or ~~2211.1.1.2~~2206.1.1.2, as applicable.

~~2211.1.1.1~~2206.1.1.1 Seismic Design Categories B and C. Where a response modification coefficient, *R*, in accordance with ASCE 7, Table 12.2-1 is used for the design of cold-formed steel *light-frame construction* assigned to *Seismic Design Category* B or C, the *seismic force-resisting system* shall be designed and detailed in accordance with the requirements of AISI S400.

Exception: The response modification coefficient, *R*, designated for “Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems” in ASCE 7, Table 12.2-1, shall be permitted for systems designed and detailed in accordance with AISI S240 and need not be designed and detailed in accordance with AISI S400

~~2211.1.1.2~~2206.1.1.2 Seismic Design Categories D through F. In cold-formed steel *light-frame construction* assigned to *Seismic Design Category* D, E or F, the *seismic force-resisting system* shall be designed and detailed in accordance with AISI S400.

~~2211.1.2~~2206.1.2 Prescriptive framing. Detached one- and two-family *dwellings* and *townhouses*, less than or equal to three*stories above grade plane*, shall be permitted to be constructed in accordance with AISI S230 subject to the limitations therein.

~~2211.1.3~~2206.1.3 Truss design. Cold-formed steel trusses shall comply with the additional provisions of Sections~~2211.1.3.1~~2206.1.3.1. through ~~2211.1.3.3~~2206.1.3.3.

~~2211.1.3.1~~2206.1.3.1 Truss design drawings. The truss design drawings shall conform to the requirements of Section I1 of AISI S202 and shall be provided with the shipment of trusses delivered to the job site. The truss design drawings shall include the details of permanent *individual truss member* restraint/bracing in accordance with Section I1.6 of AISI S202 where these methods are utilized to provide restraint/bracing.

~~2211.1.3.2~~2206.1.3.2 Trusses spanning 60 feet or greater. The owner or the owner's authorized agent shall contract with a *registered design professional* for the design of the temporary installation restraint/bracing and the permanent *individual truss member* restraint/bracing for trusses with clear spans 60 feet (18 288 mm) or greater. *Special inspection* of trusses over 60 feet (18 288 mm) in length shall be in accordance with Section 1705.2.

~~2211.1.3.3~~2206.1.3.3 Truss quality assurance. Trusses not part of a manufacturing process that provides requirements for quality control done under the supervision of a third-party quality control agency in accordance with AISI S240 Chapter D shall be fabricated in compliance with Sections 1704.2.5 and 1705.2, as applicable.

~~2211.2~~2206.2 Nonstructural framing systems ~~members.~~ For cold-formed steel *light-frame construction*, the design and installation of nonstructural members and connections shall be in accordance with AISI S220.

Add new text as follows:

2207
STEEL DECK

Revise as follows:

~~2210.1.1~~2207.1 General ~~Steel decks.~~ The design and construction of cold-formed steel decks shall be in accordance with this section. The design of cold-formed steel diaphragms shall be in accordance with additional provisions of AISI S310 as applicable.

~~2210.1.1.1~~2207.1.1 Noncomposite steel floor decks. Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0.

~~2210.1.1.2~~2207.1.2 Steel roof deck. Steel *roof decks* shall be permitted to be designed and constructed in accordance with ANSI/SDI-RD1.0.

~~2210.1.1.3~~2207.1.3 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with SDI-C.

SECTION ~~2207~~2208
STEEL JOISTS

~~2207.1~~2208.1 General. The design, manufacture and use of open-web *steel joists* and joist girders shall be in accordance with either SJI 100 or SJI 200, as applicable.

~~2207.1.1~~2208.1.1 Seismic design. Where required, the seismic design of buildings shall be in accordance with the additional provisions of Section ~~2205.2~~2202.2 or ~~2211.1.1~~2206.1.1.

~~2207.2~~2208.2 Design. The *registered design professional* shall indicate on the *construction documents* the *steel joist* and *steel joist* girder designations from ~~the specifications listed in Section 2207.1~~SJI 100 or SJI 200; and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, bridging design that differs from ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~, bridging termination connections and bearing connection design to resist uplift and lateral *loads*. These documents shall indicate special requirements as follows:

1. Special *loads* including:
   1.1. Concentrated *loads*.
   1.2. Nonuniform *loads*.
   1.3. Net uplift *loads*.
   1.4. Axial *loads*.
   1.5. End moments.
   1.6. Connection forces.
2. Special considerations including:
   2.1. Profiles for joist and joist girder configurations that differ from those defined by~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~.
   2.2. Oversized or other nonstandard web openings.
   2.3. Extended ends.
3. Live and total *load* deflection criteria for joists and joist girder configurations that differ from those defined by~~the~~ SJI 100 or SJI 200 ~~specifications listed in Section 2207.1~~.

~~2207.3~~2208.3 Calculations. The *steel joist* and joist girder manufacturer shall design the *steel joists* and *steel joist* girders in accordance with ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~ to support the *load* requirements of Section ~~2207.2~~2208.2. The *registered design professional* shall be permitted to require submission of the*steel joist* and joist girder calculations as prepared by a *registered design professional* responsible for the product design. Where requested by the*registered design professional*, the *steel joist* manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's *registered design professional*. In addition to the design calculations submitted under seal and signature, the following shall be included:

1. Bridging design that differs from ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~, such as cantilevered conditions and net uplift.
2. Connection design for:
   2.1. Connections that differ from ~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~, such as flush-framed or framed connections.
   2.2. Field splices.
   2.3. Joist headers.

~~2207.4~~2208.4 Steel joist drawings. *Steel joist* placement plans shall be provided to show the*steel joist* products as specified on the *approved construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section ~~2207.2~~2208.2. *Steel joist* placement plans shall include, at a minimum, the following:

1. Listing of applicable *loads* as stated in Section ~~2207~~2208.2 and used in the design of the*steel joists* and joist girders as specified in the *approved construction documents*.
2. Profiles for joist and joist girder configurations that differ from those defined by~~the~~ SJI 100 or SJI 200~~specifications listed in Section 2207.1~~.
3. Connection requirements for:
   3.1. Joist supports.
   3.2. Joist girder supports.
   3.3. Field splices.
   3.4. Bridging attachments.

4. Live and total *load* deflection criteria for joists and joist girder configurations that differ from those defined by~~the~~ SJI 100 or SJI 200 ~~specifications listed in Section 2207.1~~.
5. Size, location and connections for bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's *registered design professional*.

~~2207.5~~2208.5 Certification. At completion of manufacture, the *steel joist* manufacturer shall submit a *certificate of compliance* to the owner or the owner's authorized agent for submittal to the *building official* as specified in Section 1704.5 stating that work was performed in accordance with *approved construction documents* and with SJI 100 or SJI 200, as applicable ~~specifications listed in Section 2207.1~~.

SECTION 2209
STEEL STORAGE RACKS

Revise as follows:

2209.1 ~~Steel storage racks~~General. The design, testing and utilization of steel *storage racks* made of cold-formed or hot-rolled steel structural members shall be in accordance with ~~RMI~~ ANSI/MH 16.1. The design testing, and utilization of steel cantilevered *storage racks* made of cold-formed or hot-rolled steel structural members shall be in accordance with ANSI/MH 16.3~~W here required by ASCE 7, the seismic design of steel *storage racks* shall be in accordance with Section 15.5.3 of ASCE 7~~.

2209.2 ~~Steel cantilevered storage racks~~ Seismic design. ~~The design, testing and utilization of steel cantilevered *storage racks* made of cold-formed or hot-rolled steel structural members shall be in accordance with RMI ANSI/MH 16.3.~~ Where required by ASCE 7, the seismic design of steel *storage racks* and cantilevered steel *storage racks* shall be in accordance with Section 15.5.3 of ASCE 7.

2209.3 Certification. For ~~rack~~ steel storage racks ~~structures~~ that are 8 feet (2438 mm) in height or greater to the top *load* level and assigned to *Seismic Design Category* D, E, or F at completion of the *storage rack* installation, a *certificate of compliance* shall be submitted to the owner or the owner's authorized agent stating that the work was performed in accordance with approved construction documents.

SECTION ~~2208~~22010
STEEL CABLE STRUCTURES

~~2208.1~~2210.1 General. The design, fabrication and erection including related connections, and protective coatings of steel cables for buildings shall be in accordance with ASCE 19.

Add new standard(s) as follows:

AISC

American Institute of Steel
130 East Randolph Street, Suite 2000
Chicago, IL 60601-6219

ANSI/AISC 370-21	Specification for Structural Stainless Steel Buildings

AISI

American Iron and Steel Institute
25 Massachusetts Avenue, NW Suite 800
Washington, DC 20001

S310-20 w/S1-22	North American Standard for the Design of Steel Deck Diaphragms, 2020 Edition, with Supplement 1, 2022 Edition

Reason: This code change proposal is intended to be an editorial reorganization of IBC Chapter 22 for the purpose of providing better flow, usability, and clarification of steel provisions in the building code. The steel provisions within Chapter 22 of the IBC have been pieced together as they have been developed over the life of the document. This process has resulted in provisions that are technically accurate, but can seem disorganization and confusing from the perspective of the user. The following reasoning is provided for the revisions proposed in each section of this document:

Section 2201: I am proposing to include existing sections on Identification (2202), Protection of Steel for Structural Purposes (2203), and Connections (2204) as subsections under General Section 2201. Each of the existing sections (2202, 2203, 2204) simply serve as pointers to the other product specific sections, and in turn reference standards, within Chapter 22. I have retained the concept of addressing these topics through the applicable reference standards and any additional provisions on each topic. This proposed revision simply consolidates the language to provide a more concise path under the General steel section.

Section 2202: I am proposing to combine the existing Structural Steel (Section 2205) and Composite Structural Steel and Concrete Structures (2206) sections into one section (2202). Both AISC 360 and AISC 341 (referenced in Sections 2205 and 2206) contain the provisions for both Structural Steel and Composite Structural Steel and Concrete as well as the necessary references to ACI 318. The proposal to combine the two sections simply eliminates unnecessary duplication while maintaining the necessary provisions.

Section 2203: This section introduces a new section on Structural Stainless Steel and the new AISC 370 -*Specification for Structural Stainless Steel Buildings*. I am proposing this section, and reference standard, in this proposal primarily for purposes of coordination with respect to section numbering. I am proposing to add these provisions to directly follow those of structural steel as a logical flow of the chapter. This standard was developed as a consensus document using ANSI-accredited procedures to provide a uniform practice in the design of structural stainless steel-framed buildings and other structures.

The AISC 370 Specification is available for free download at www.aisc.org/publications/steel-standards/

Section 2204: These proposed revisions are intended to clarify when to use AISI S100 -*North American Specification for the Design of Cold-Formed Steel Structural Members*. The following cold-formed steel product design standards are developed based on the applicable provisions of AISI S100: AISI framing standards (AISI S220, S240, S400), Steel Deck Institute, Steel Joist Institute, Steel Rack Institute (for cold-formed racks). It is the intention that the product design standards are the primary resource for the design of these specific systems. In lieu of provisions within the product specific design standards, AISI S100 provisions are permitted to be used for the design of applicable cold-formed steel members or systems. The proposed language clarifies that the design standards referenced in the following product specific sections are to be used for the design of those members and systems.

Section 2204.2 also provides clarification regarding the design of cold-formed steel seismic force resisting systems not covered in the following sections.

Section 2205: This section splits the cold-formed stainless-steel provisions into its own section as it references a separate ASCE 8 Standard for the design. The ASCE 8 standard was previously referenced under the existing cold-formed steel section (2210).

Section 2206: This section on cold-formed steel light-framed construction remains essentially unchanged with some minor reference section renumbering.

Section 2207: This section follows the format of the rest of Chapter 22 by splitting out the steel deck provisions into its own section as the Steel Deck Institute develops a series of design standards specific to the design and detailing of steel deck members and systems. These provisions were previously referenced under the existing cold-formed steel section (2210).

Section 2208: This section on steel joists remains essentially unchanged with some minor reference section renumbering.

Section 2209: I have proposed minor reformatting revisions to this section on steel storage racks. To coordinate with the format of the other sections, I am proposing to have the subsections categorized as “general design provisions” and “seismic design provisions” as opposed to categorized by product. The technical content of the provisions remain unchanged.

Section 2210: This section on steel cable structures remains unchanged with just renumbering of the section.

This proposal is a coordinated effort with the American Institute for Steel Construction (AISC), Steel Joist Institute (SJI), Steel Deck Institute (SDI), Metal Building Manufacturers Association (MBMA), Rack Manufacturers Association (RMA), and the steel framing industry. There are concurrent code change proposals submitted on behalf of MBMA, to add Metal Building Systems, and SDI, to revise Section 2207, that have been coordinated with AISI and this proposal. Those proposals are intended to work jointly with, and do not conflict with, this proposal.

Bibliography: AISC, “ANSI/AISC 370 - Specification for Structural Stainless Steel Buildings", American Institute of Steel Construction, Chicago, IL, 2021 edition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is intended to be an editorial reorganization of existing provisions, and will not impact cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2201.5 Anchor Rods. Anchor rods shall be set in accordance with the*approved construction documents.* The protrusion of the threaded ends through the connected material shall fully engage the threads of the nuts, but shall not be greater than the length of thethreaded portion of ~~threads on~~ the bolts.

Committee Reason: Approved as modified as the proposal reorganizes the sections for improved flow. The committee noted that the addition of AISC 370-21 added a needed standard for structural stainless steel buildings. The modification provides a clarification of the length of the threaded portion of the bolt in section 2201.5. (Vote: 13-0)

Final Hearing Results

S187-22	AM

S189-22

Original Proposal

IBC: 2207.2, 2207.4

Proponents: Jon-Paul Cardin, American Iron and Steel Institute, Steel Joist Institute (jcardin@steel.org)

2021 International Building Code

Revise as follows:

2207.2 Design. The *registered design professional* shall indicate on the *construction documents* the *steel joist* and *steel joist* girder designations from the specifications listed in Section 2207.1; and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, bridging design that differs from the SJI specifications listed in Section 2207.1, bridging termination connections and bearing connection design to resist uplift and lateral *loads*. These documents shall indicate special requirements as follows:

1. Special *loads* including:
   1.1. Concentrated *loads*.

   1.2. Nonuniform *loads*.

   1.3. Net uplift *loads*.

   1.4. Axial *loads*.

   1.5. End moments.

   1.6. Connection forces.

2. Special considerations including:
   2.1. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

   2.2. Oversized or other nonstandard web openings.

   2.3. Extended ends.

3. ~~Live and total *load* deflection~~ Deflection criteria for joists and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

2207.4 Steel joist drawings. *Steel joist* placement plans shall be provided to show the *steel joist* products as specified on the *approved construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2207.2. *Steel joist* placement plans shall include, at a minimum, the following:

1. Listing of applicable *loads* as stated in Section 2207.2 and used in the design of the *steel joists* and joist girders as specified in the *approved construction documents*.

2. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

3. Connection requirements for:
   3.1. Joist supports.

   3.2. Joist girder supports.

   3.3. Field splices.

   3.4. Bridging attachments.

4. ~~Live and total *load* deflection~~ Deflection criteria for joists and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

5. Size, location and connections for bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's*registered design professional*.

Reason: This code change proposal is intended to correlate the language in the IBC with that used in the Steel Joist Institute (SJI) specifications with respect to deflection considerations. The SJI 100 and SJI 200 Specifications refer to the "deflection due to the design live load" for consideration of deflection criteria. Therefore, there is no SJI requirement or reference to provide total load criteria for steel joist deflection calculation. The 2021 IBC Section 2207 identifies that open-web steel joists shall be in accordance with SJI 100 or SJI 200, as applicable. The IBC states “Live and total load deflection criteria as defined by the SJI specifications” shall be provided, yet SJI has no total load deflection criteria requirement. The difference in language between the 2021 IBC and the SJI Specifications cause confusion for designers and building officials with respect to the loads used to calculate deflection of steel joist members. This code change will correlate the language in the IBC and the SJI Specifications and provide clarification, while also remaining clear that the designer shall list any deflection criteria they deem to be required.

Bibliography: SJI 100–20: 45th Edition Standard Specifications, Load Tables and Weight Tables for K-Series, LH-Series, DLH-Series and Joist
Girders

SJI 200–15: 2nd Edition Standard Specifications, Weight Tables and Bridging Tables for CJ-Series Composite Steel Joists

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is simply clarifying requirements of current provisions.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal correctly adjusts the provisions to align with SJI 100 and SJI 200 for deflections. (Vote: 13-0)

Final Hearing Results

S189-22 AS

S191-22

Original Proposal

IBC: 2209.3 (New), MHI Chapter 35 (New)
Proponents: Paul Armstrong, MHI

2021 International Building Code

Add new text as follows:

2209.3 Industrial boltless steel shelving. The design, testing and utilization of industrial boltless steel shelving shall be in accordance with ANSI/MH 28.2. Where required by ASCE 7, the seismic design of industrial boltless steel shelving shall be in accordance with Chapter 15 of ASCE 7.

Add new standard(s) as follows:

MHI

Material Handling Institute
8720 Red Oak Blvd. Suite 201
Charlotte, NC 28217

ANSI/MH 28.2-2022 Design, Testing and Utilization of Industrial Boltless Steel Shelving

Reason: The Storage Manufacturer's Association (SMA) of the Material Handling Industry (MHI) has developed a standard for the design, testing and utilization of industrial boltless steel shelving with the assistance of the FEMA Seismic Code Support committee. This is the industry standard for industrial boltless steel shelving systems already in use today.

Cost Impact: The code change proposal will decrease the cost of construction
The inclusion of this standard will provide a single industry accepted set of criteria for this type of material handling system. As a result, the cost of construction will reduce by complying with only one set of requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

SECTION 2210
INDUSTRIAL BOLTLESS STEEL SHELVING

~~2209.3~~ 2210.1 ~~Industrial boltless steel shelving~~ General. The design, testing and utilization of industrial boltless steel shelving shall be in accordance with ANSI/MH 28.2. Where required by ASCE 7, the seismic design of industrial boltless steel shelving shall be in accordance with Chapter 15 of ASCE 7.

Committee Reason: Approved as modified as per the provided reason statement. The committee noted that the proposal provides a needed reference for the building official. The modification is needed to improve flow by moving the provision to it's own Section. (Vote: 13-0)

Final Hearing Results

S192-22

Original Proposal

IBC: 2209.4 (New), MHI Chapter 35 (New)

Proponents: Paul Armstrong, PACCS, MHI (paul@7arms.com)

2021 International Building Code

Add new text as follows:

2209.4 Material handling stairs, ladders and guards. The design and installation of stairs, ladders and guarding serving material handling structures shall be in accordance with ANSI/MH 32.1.

Add new standard(s) as follows:

MHI

Material Handling Institute
8720 Red Oak Blvd. Suite 201
Charlotte, NC 28217

ANSI/MH 32.1-2018 Stairs, Ladders and Open-Edge Guards for Use with Material Handling Structures

Reason: The Material Handling Industry (MHI) has two product groups, Rack Manufacturer's Institute (RMI) and Storage Manufacturer's Association (SMA), that have compared and compiled OSHA and Building Code that apply to employee access ways serving various materials handling types of structures. The RMI and SMA have developed this compiled information into an ANSI consensus Standard ANSI/MH 32.1. This will give consistency and consistent interpretations between employee safety regulations promulgated by OSHA and the adopted IBC in local and state jurisdictions.

Cost Impact: The code change proposal will decrease the cost of construction
In a number of projects across the U.S. local jurisdictions have interpreted that Chapter 10 Means of Egress criteria applies to employee only access ways serving material handling structures. This will allow for less costly access devices to be used that are in compliance with OSHA regulations.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2212
STAIRS, LADDERS AND GUARDING FOR STEEL STORAGE RACKS AND INDUSTRIAL STEEL WORK PLATFORMS

~~**2209.4 Material handling stairs, ladders and guards.**~~**2212.1 General.** The design and installation of stairs, ladders and guarding serving ~~material handling structures~~ steel storage racks and industrial steel work platforms shall be in accordance with ANSI/MH 32.1.

Committee Reason: Approved as modified as per the provided reason statement. The committee expressed concerns about the use of the new term 'guarding' in the new Sections 2212 and 2212.1. (Vote: 8-5)

Public Comments

Public Comment 1

Proponents: Gwenyth R. Searer, Wiss, Janney, Elstner Associates, Inc., myself (gsearer@wje.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

2212.1 General. The design and installation of stairs, ladders and guarding serving steel storage racks and industrial steel work platforms <u>used in material handling structures</u> shall be in accordance with ANSI/MH 32.1.

Commenter's Reason: The original proposal (i.e., prior to the floor modification) covered stairs, ladders, and guards serving material handling structures. Since material handling structures are a specialized subset of elements in a building, this made sense. The floor modification, also proposed by the proponent, seemed innocuous at first blush; however, it has the potential to alter the governing requirements in an unanticipated way.
Consider a steel-framed platform that is used to service HVAC equipment in a building or a factory. Do the guards on that platform have to comply with IBC Section 1607.9, or do they have to comply with the MH 32.1 standard ("Stairs, Ladders, and Open-Edge Guards for Use with Material Handling Structures")? Do the stairs or ladder used to access the HVAC platform have to comply with the structural and architectural requirements in the IBC or do they have to only comply with the MH32,1 standard? If this proposal is adopted as modified by the committee. it is not clear.

In short, the floor modification appears to have inadvertently included all steel-framed platforms and work areas instead of limiting application of the MH 32.1 standard just to the very specialized subset of "industrial steel work platforms used in material handling structures", which is what the MH 32.1 standard covers. Extending the MH 32.1 to all "industrial steel work platforms" is simply not appropriate and makes it difficult to determine what provisions govern steel-framed floors or work areas in buildings and other structures that are not part of material handling structures.

This public comment corrects the as-modified proposal so that only those very specialized structures that MH 32.1 covers are governed by the MH 32-1 standard.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The intent of the public comment is to clarify that stairs, ladders, and guards that serve steel-framed work platforms are governed by the IBC unless they very specifically serve industrial steel work platforms used for material handling structures. This will not increase or decrease the cost of construction, but will simplify clarify which provisions apply where.

Final Hearing Results

S192-22	AMPC1

S193-22

Original Proposal

IBC: 2209.4 (New), MHI Chapter 35 (New)
Proponents: Paul Armstrong, MHI

2021 International Building Code

Add new text as follows:

2209.4 Industrial steel work platforms. The design, testing and utilization of industrial steel work platforms shall be in accordance with ANSI/MH 28.3. Where required by ASCE 7, the seismic design of industrial steel work platforms shall be in accordance with Chapter 15 of ASCE 7.

Add new standard(s) as follows:

MHI

Material Handling Institute
8720 Red Oak Blvd. Suite 201
Charlotte, NC 28217

ANSI/MH 28.3-22 Design, Testing and Utilization of Industrial Steel Work Platforms

Reason: The Storage Manufacturer's Association (SMA) of the Material Handling Industry (MHI) has developed a standard for the design, testing and utilization of industrial steel work platforms with the assistance of the FEMA Seismic Code Support committee. This is the industry standard for industrial steel work platforms already used today.

Cost Impact: The code change proposal will decrease the cost of construction
The inclusion of this standard will provide a single industry accepted set of criteria for this type of material handling structure. As a result, the cost of construction will reduce by complying with only one set of requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2211
INDUSTRIAL STEEL WORK PLATFORMS

~~2209.4~~ 2211.1 ~~Industrial steel work platforms~~ General. The design, testing and utilization of industrial steel work platforms shall be in accordance with ANSI/MH 28.3. Where required by ASCE 7, the seismic design of industrial steel work platforms shall be in accordance with Chapter 15 of ASCE 7.

Committee Reason: Approved as modified per the provided reason statement. The proposal provides useful information for building officials. The modification is needed to improve flow by moving the provision to it's own Section. (Vote: 12-0)

Final Hearing Results

S194-22

Original Proposal

IBC: 2210.1.1, 2210.1.1.1, 2210.1.1.2, 2210.1.1.3, CHAPTER 35, SDI Chapter 35

Proponents: Thomas Sputo, Steel Deck Institute, Steel Deck Institute (tsputo50@gmail.com)

2021 International Building Code

Revise as follows:

2210.1.1 Steel decks. The design and construction of cold-formed steelfloor and roof decks and composite slabs of concrete and steel deck shall be in accordance with~~this section~~ SDI-SD.

Delete without substitution:

~~**2210.1.1.1 Noncomposite steel floor decks.** Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0.~~

~~**2210.1.1.2 Steel roof deck.** Steel *roof decks* shall be permitted to be designed and constructed in accordance with ANSI/SDI-RD1.0~~.

~~**2210.1.1.3 Composite slabs on steel decks.** Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with SDI-C.~~

CHAPTER 35 REFERENCED STANDARDS

Delete and substitute as follows:

SDI

Steel Deck Institute
2661 Clearview Road #3
Allison Park, PA 15101

~~SDI NC–2017~~	~~Standard for Noncomposite Steel Floor Deck~~
SDI SD-2022	Standard for Steel Deck

Delete without substitution:

SDI

Steel Deck Institute
2661 Clearview Road #3
Allison Park, PA 15101

~~SDI RD–2017~~	~~Standard for Steel Roof Deck~~
~~SDI-C–2017~~	~~Standard for Composite Steel Floor Deck–Slabs~~

Reason: The three previous SDI Steel Deck Standards (RD, NC, C) were combined into a single standard that covers both roof and floor deck applications (SD). This proposal removes the RD, NC, and C Standards and substitutes the new combined SD Standard. The new single Standard is easier to use than the three previous Standards. This proposal also removes the permissive language from the charging statement and makes the use of the SD Standard mandatory rather than permitted. The SD Standard was developed as a consensus standard under ANSI rules and is attached to this proposal.

Bibliography: ANSI/SDI SD-2022 *Standard for Steel Deck* (PDF attached to proposal).

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The new SD Standard combines the content of the RD, NC, and C Standards into a single document with minimal technical changes. Because changes to the content were minimal, no changes to cost of construction are expected.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal removes language that is now redundant based on adding the new standard, SDI SD-2022. Based on the committee action on S187-22, the committee recommended that the proposed new Section 2210.1.1 would fit in the reorganized chapter at the end of Section 2207. (Vote: 13-0)

Final Hearing Results

S194-22	AS

S196-22

Original Proposal

IBC: 2211.3 (New); IPC: 307.2, 307.3 (New), [BS] C101.5, [BS] C101.6; IMC: [BS] 302.5, [BS] 302.5.2, [BS] 302.5.3; IFGC: [BS] 302.6, [BS] 302.7

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

2211.3 Cutting, notching, and boring. The cutting, notching and boring of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

Reason: This proposal sets uniform requirements for field modifications to cold-formed steel framing members (cutting, notching, and boring holes) in accordance with AISI standards.
Currently, the IFGC, IMC, and IPC all provide guidance on modification of cold-formed steel framing elements within the path of utilities. Although the guidance provided by each code is similar, they are not identical in wording or scope and are handled differently within each document.

Differences include but are not limited to:

- IFGC, IMC: The cutting and notching criteria is within the main body of the code.
- IFGC, IMC: Includes direction for wood, steel, cold-formed steel, and non-structural cold-formed steel materials.
- IPC: Points to the IBC for cutting and notching criteria but provides Appendix C as an alternate.
- IPC Appendix C:
  - Includes some, but not all, cutting and notching criteria and limitations found within the IFGC and IMC.
  - Does not address steel and cold-formed materials.

This will provide clear and consistent criteria across all trades on how to field modify framing members and when modification of such members requires input from a design professional.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a coordination of existing cutting, notching and boring provisions that are already used in practice but are not identical between codes or fully aligned with AISI standards.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2021 International Building Code

2211.3 Cutting~~,~~ and notching~~, and boring~~. The cutting~~,~~ and notching ~~and boring~~ of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

2021 International Plumbing Code

307.3 Cutting~~,~~ and notching ~~and boring~~ in cold-formed steel framing. The cutting~~,~~ and notching ~~and boring~~ of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

2021 International Mechanical Code

[BS]302.5 Cutting~~,~~ and notching ~~and boring~~ in cold-formed steel framing. The cutting~~,~~ and notching ~~and boring of~~ holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members. ~~The cutting, notching and boring of steel framing members shall comply with Sections 302.5.1 through 302.5.3.~~

2021 International Fuel Gas Code

[BS]302.6 Cutting~~,~~ and notching ~~and boring~~ in cold-formed steel framing. The cutting~~,~~ and notching ~~and boring~~ of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

Committee Reason: Approved as modified as the proposal coordinates the requirements across the I-Codes and adds the needed reference to ANSI S240. The modification correctly removes reference to boring for steel. (Vote: 13-0)

Final Hearing Results

S196-22	AM

S197-22

Original Proposal

IBC: SECTION 202 (New), SECTION 2212 (New), 2212.1 (New), 2212.1.1 (New), 2212.1.1.1 (New), 2212.1.1.2 (New), 2212.1.1.3 (New), 2212.1.1.4 (New), 2212.2 (New)

Proponents: W Lee Shoemaker, Director of Research & Engineering, Thomas Associates, Inc., Metal Building Manufacturers Association (lshoemaker@mbma.com)

2021 International Building Code

Add new definition as follows:

METAL BUILDING SYSTEM.
An integrated set of fabricated components and assemblies that form a complete or partial building shell that is designed by the manufacturer. This system typically includes but is not limited to primary framing comprised of built-up structural steel members, secondary members that are cold-formed steel or open-web steel joists, a metal panel roof system and exterior wall cladding. The system is manufactured in a manner that permits plant and/or field inspection prior to assembly or erection.

Add new text as follows:

SECTION 2212
Metal Building Systems

2212.1 General. The design, fabrication and erection of a metal building system shall be in accordance with the additional provisions of this section.

2212.1.1 Design. The design of metal building systems shall be in accordance with Sections 2212.1.1.1 through 2212.1.1.4, as applicable.

2212.1.1.1 Structural Steel. The design, fabrication and erection of structural steel shall be in accordance with Section 2205.

2212.1.1.2 Cold-Formed Steel. The design of cold-formed carbon and low-alloy steel structural members shall be in accordance with Section 2210.

2212.1.1.3 Steel Joists. The design of steel joists shall be in accordance with Section 2207.

2212.1.1.4 Steel Cable. The design, fabrication and erection including related connections of steel cables shall be in accordance with Section 2208.

2212.2 Seismic Design. Where required, the seismic design, fabrication and erection of the structural steel seismic force-resisting system shall be in accordance with Section 2205.2.1 or 2205.2.2, as applicable.

Reason: This addition to Chapter 22 and the accompanying new definition will clarify what the design requirements are for a metal building system. Metal building systems are significantly different from other forms of steel construction, especially regarding the shared design responsibilities between the metal building system manufacturer and registered design professional for the project. Furthermore, with clarification of the design requirements for the different parts of the metal building system, the special inspection requirements will be better defined. This might be viewed as an unnecessary clarification, but many construction documents are being used that list nonexistent "MBMA Standards" as the governing design requirements. This will be a real benefit to designers and building officials and lead to better construction documents and better construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This clarification of design requirements will not impact the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2212.1 General. The design, fabrication and erection of a metal building system shall be in accordance with the~~additional~~ provisions of this section.

Committee Reason: Approved as modified as per the provided reason statement. The proposal provides a clear set of requirements for metal building systems. The committee noted that the last sentence in the proposed new definition could cause confusion on the inspection location. The modification removes the unnecessary word, 'additional'. (Vote: 11-2)

Final Hearing Results

S197-22	AM

S198-22

Original Proposal

IBC: 2103.1

Proponents: Phillip Samblanet, The Masonry Society, The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, National Concrete Masonry Association, Masonry Alliance for Codes and Standards (jthompson@ncma.org)

2021 International Building Code

Revise as follows:

2103.1 Masonry units. Concrete *masonry units*, clay or shale *masonry units*, stone *masonry units*, *glass unit masonry* and *AAC masonry* units shall comply with Article 2.3 of TMS 602. Architectural *cast stone* shall conform to ~~ASTM C1364 and~~ TMS 504. ~~Adhered manufactured stone masonry *veneer* units shall conform to ASTM C1670~~.

> **Exception:** *Structural clay tile* for nonstructural use in fireproofing of structural members and in wall furring shall not be required to meet the compressive strength specifications. The *fire-resistance rating* shall be determined in accordance with ASTM E119 or UL 263 and shall comply with the requirements of Table 705.5.

Reason: In an effort to delete redundant provisions, the reference to ASTM C1364 is proposed for deletion because TMS 504 requires compliance with that standard. Likewise, TMS 602 now addresses adhered manufactured stone masonry veneer (it did not previously) making the last sentence redundant and unneeded as it is covered by the reference to TMS 602, Article 2.3.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply deletes redundant requirements. As such, there is no impact on construction costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal removes redundant language and as per the provided reason statement. (Vote: 12-1)

Final Hearing Results

S198-22	AS

S199-22

Original Proposal

IBC: 2301.2, 2304.11.3.1, 2304.11.4.1

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2301.2 ~~Nominal Sizes~~ Dimensions. For the purposes of this chapter, where dimensions of lumber are specified, they shall be deemed to be nominal dimensions unless specifically designated as actual dimensions (see Section 2304.2). Where dimensions of *cross-laminated timber* thickness are specified, they shall be deemed to be actual dimensions.

2304.11.3.1 Cross-laminated timber floors. *Cross-laminated timber* shall be not less than 4 inches (102 mm) in~~actual~~ thickness. *Cross-laminated timber* shall be continuous from support to support and mechanically fastened to one another.*Cross-laminated timber* shall be permitted to be connected to walls without a shrinkage gap providing swelling or shrinking is considered in the design. Corbelling of masonry walls under the floor shall be permitted to be used.

2304.11.4.1 Cross-laminated timber roofs. *Cross-laminated timber* roofs shall be not less than 3 inches (76 mm)~~nominal~~ in thickness and shall be continuous from support to support and mechanically fastened to one another.

Reason: Clarify that cross-laminated timber (CLT) thickness is an actual dimension and describe CLT thickness consistently. In 2304.11.3.1 delete “actual”, and in 2304.11.4.1 delete “nominal”. With these changes CLT thickness will appear consistently with existing use in 2304.11.2.1 and 602.4.4.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change implements consistent terminology for CLT thickness.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal correctly clarifies that cross-laminated timber is based on actual dimensions. The committee did note that the organization of the proposal could be improved. (Vote: 13-0)

Final Hearing Results

S199-22 AS

S200-22

Original Proposal

IBC: 2303.1, 2303.1.4

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2303.1 General. Structural sawn lumber; end-jointed lumber; *prefabricated wood I-joists*; *structural glued-laminated timber*; *cross-laminated timber*; *wood structural panels*; fiberboard sheathing (where used structurally); *hardboard* siding (where used structurally); *particleboard*; *preservative-treated wood*; structural log members; *structural composite lumber*; round timber poles and piles; *fire-retardant-treated wood*; hardwood plywood; wood trusses; joist hangers; nails; and staples shall conform to the applicable provisions of this section.

2303.1.4 ~~Structural glued cross~~ Cross-laminated timber. Cross-laminated timbers shall be manufactured and identified in accordance with ANSI/APA PRG 320.

Reason: Adds cross-laminated timber to list of products in Section 2303.1 and updates name for consistency in Section 2303.1.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates general requirements to include cross-laminated timber.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal correctly updates the building material name of 'cross-laminated timber' in sections 2303.1 and 2303.1.4. (Vote: 13-0)

Final Hearing Results

S200-22	AS

S201-22

Original Proposal

IBC: 2303.2, 2303.2.1 (New), ASTM Chapter 35 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

2303.2 Fire-retardant-treated wood. *Fire-retardant-treated wood* is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. ~~Additionally, the~~ The ASTM E84 or UL 723 test shall be continued for~~a~~ an additional 20-minute period and the flame front shall not progress more than $10^{1}/_{2}$ feet (3200 mm) beyond the centerline of the burners at any time during the test.

Add new text as follows:

2303.2.1 Alternate fire testing. A wood product impregnated with chemicals by a pressure process or other means during manufacture, which, when tested to ASTM E2768, has a listed flame spread index of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test, shall also be considered fire-retardant-treated wood.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2768 -11(2018)	Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

Reason: ASTM E2768 was developed specifically intended for code use. It is a standardized version of ASTM E84 with the extension from 10 minutes to 30 minutes (meaning an additional 20 minutes) and it measures exactly what the extended ASTM E84 does, namely flame spread index and flame front progression beyond the centerline of the burners. This standard is already included in the IWUIC and the language proposed is consistent with the IWUIC language.
The change to the existing section is for language consistency (the exact same language is being proposed in the IRC). It is best to state that the test is continued for "an additional" 20 minutes.

Note that this change adds a new section without deleting any existing section. Thus, sections 2303.2.1 through 2303.2.9 will have to be renumbered as 2303.2.2 through 2303.2.10.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simple clarification/ ASTM E2768 is the same as the extended ASTM E84 test.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2303.2.1 Alternate fire testing. ~~A~~ Fire-retardant-treated wood is also any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have ~~which~~, when tested in accordance with ~~to~~ ASTM E2768, ~~has~~ a listed flame spread index of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test~~, shall also be considered fire-retardant-treated wood~~.

Committee Reason: Approved as modified as the proposal appropriately adds a pointer to the ASTM E2768 as the alternate fire testing requirements. The modification provides the needed rewording to improve clarity of the intent. (Vote: 10-3)

Final Hearing Results

S201-22	AM

S202-22

Original Proposal

IBC: 2303.2.5, 2303.2.5.1, 2303.2.5.2

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2303.2.5 ~~Strength adjustments~~ Design values. Design values for ~~untreated lumber and *wood structural panels,*~~ *fire-retardant-treated wood*, including connection design values, shall be subject to all adjustments applicable to untreated wood as specified in this chapter and shall be further adjusted to account for the effects of the fire-retardant treatment. ~~Section 2303.1, shall be adjusted for *fire-retardant-treated wood.*~~ Adjustments to design values for the effects of the fire-retardant treatment shall be based on an *approved* method of investigation that takes into consideration ~~the effects of~~ the anticipated temperature and humidity to which the *fire-retardant-treated wood* will be subjected, the type of treatment and the redrying procedures. Adjustments to flexural design values for fire-retardant-treated plywood shall be determined in accordance with Section 2303.2.5.1. Adjustments to flexural, tension, compression and shear design values for fire-retardant-treated lumber shall be determined in accordance with Section 2303.2.5.2.

2303.2.5.1 ~~Wood structural panels~~ Fire-retardant-treated plywood. The effect of treatment and ~~the method of~~ redrying after treatment, and any treatment-based effects due to exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516. The test data developed ~~by~~ in accordance with ASTM D5516 shall be used to develop treatment adjustment factors~~, maximum *loads* and spans, or both, for untreated plywood design values~~ in accordance with ASTM D6305. Each manufacturer shall publish the allowable maximum *loads* and spans for service as floor and roof sheathing for its treatment based on the adjusted design values and taking into account the climatological location.

2303.2.5.2 Fire-retardant-treated lumber. For each species of wood that is treated, the effect~~s~~ of ~~the~~ treatment~~, the method of~~ and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664. The test data developed ~~by~~ in accordance with ASTM D5664 shall be used to develop ~~modification~~ treatment adjustment factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841. Each manufacturer shall publish the ~~modification~~ treatment adjustment factors for service at maximum temperatures of not less than 80°F (27°C) and for roof framing. The roof framing modification factors shall take into consideration the climatological location.

Reason: Section 2303.2.5 is revised to clarify that design values for fire-retardant-treated wood products are subject to all of the adjustments for untreated wood products and also must be adjusted to account for the effect of the fire-retardant treatment. This clarification aligns with ASTM D5664/D6841 for lumber and ASTM D5516/D6305 for plywood. In both cases, the fire-retardant treatment adjustment factors isolate the additional effect of the fire-retardant treatment, but do not address how the constituent untreated wood materials themselves need to be adjusted for typical application conditions. For this reason, design values for fire-retardant-treated wood products must be adjusted by factors that are applicable to untreated wood as well as the treatment adjustment factors.
A new sentence is added at the end of 2303.2.5 to reference 2303.2.5.1 and 2303.2.5.2 as strictly pertaining to fire-retardant-treated plywood and fire-retardant-treated lumber, respectively. These subsequent sections have also been revised accordingly, to reflect the fact that the standards referenced therein are specific to fire-retardant-treated plywood and fire-retardant-treated lumber, respectively.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides clarification of the requirements consistent with the intent of existing code provisions and referenced standards.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal correctly clarifies the design values to align with ASTM D5664 and ASTM D5516. The committee expressed concerns with the deletion of the reference to 'wood structural panels' and with the addition of possibly unnecessary pointers. (Vote: 9-3)

Final Hearing Results

S202-22	AS

S203-22

Original Proposal

IBC: 2303.2.5, 2303.2.5.3 (New), ASTM Chapter 35 (New)

Proponents: Jason Smart, American Wood Council (jsmart@awc.org); David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2303.2.5 Strength adjustments. Design values for untreated lumber, and *wood structural panels*, as specified in Section 2303.1, shall be adjusted for *fire-retardant-treated wood*. Adjustments to design values shall be based on an*approved* method of investigation that takes into consideration the effects of the anticipated temperature and humidity to which the *fire-retardant-treated wood* will be subjected, the type of treatment and redrying procedures. Design values and treatment adjustment factors for fire-retardant-treated laminated veneer lumber shall be determined in accordance with 2303.2.5.3.

Add new text as follows:

2303.2.5.3 Fire-retardant-treated laminated veneer lumber. The effect of treatment and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated laminated veneer lumber shall be determined in accordance with ASTM D8223. Each manufacturer shall publish reference design values and treatment-based design value adjustment factors in accordance with ASTM D8223, taking into account the climatological location.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8223-19 Standard Practice for Evaluation of Fire-Retardant Treated Laminated Veneer Lumber

Reason: This change adds provisions for fire-retardant-treated laminated veneer lumber design values and adjustments for treatment effects to be developed in accordance with the new ASTM standard D8223. The provision requiring that each manufacturer publish reference design values and treatment-based design value adjustment factors is consistent with similar existing provisions in 2303.2.5.1 and 2305.2.5.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds provisions addressing development of design values and adjustments for fire-retardant-treated laminated veneer lumber (LVL) , which is currently not specifically addressed by the code. It does not affect when or where FRT LVL can be used as a building element.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. (Vote: 13-0)

Final Hearing Results

S203-22 AS

S206-22

Original Proposal

IBC: TABLE 2304.6.1

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Building Code

Revise as follows:

TABLE 2304.6.1 MAXIMUM ~~ALLOWABLE STRESS~~ BASICDESIGN WIND SPEED, V_{asd}, PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM ALLOWABLE STRESS BASIC DESIGN WIND SPEED, V_{asd} [d] (MPH)		
							Wind exposure category		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	B	C	D
6d common (2.0" × 0.113")	1.5	24/0	3/8	16	6	12	140 110	115 90	110 85
		24/16	7/16	16	6	12	150 110	125 100	115 90
						6	190 150	160 125	150 110
8d common (2.5" × 0.131")	1.75	24/16	7/16	16	6	12	170 130	140 110	135 105
						6	190 150	160 125	150 110
				24	6	12	140 110	115 90	110 85
						6	140 110	115 90	110 85

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30~~.7~~.4 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or 2308.

c. Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating. Plywood siding rated 16 on center or 24 on center shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and plywood siding 16 on center shall be used with studs spaced not more than 16 inches on center.

d. ~~V_{asd} shall be determined in accordance with Section 1609.3.1.~~

Reason: This proposal changes the table format from the allowable stress design wind speed (V_{asd}) to the basic design wind speed (V) for consistency with the rest of the IBC. This proposal evaluates the stud and panel capacities, nail withdrawal resistance, and nail-head pull-through capacities in the same manner as the existing table, resulting in comparable design requirements as the V values that are soft-converted from V_{asd} values in accordance with Section 1609.3.1. The tabulated V values are also consistent with those values already published in the 2021 IRC Table R602.3(3). For Footnote (b), Section 30.7 in the previous ASCE 7-10 should be Section 30.4 in ASCE 7-16. Since the revised table is in the format of basic design wind speed, the existing Footnote (d) is no longer required and should be deleted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal updates the table format, which results in comparable design requirements as the current table when the allowable stress design wind speed is soft-converted to the basic design wind speed in accordance with Section 1609.3.1.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 2304.6.1 MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V, PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V (MPH)		
							Wind exposure category		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	B	C	D
6d common (2.0" × 0.113")	1.5	24/0	$^{3}/_{8}$	16	6	12	140	115	110
		24/16	$^{7}/_{16}$	16	6	12	150	125	115
						6	190	160	150
8d common (2.5" × 0.131")	1.75	24/16	$^{7}/_{16}$	16	6	12	170	140	135
						6	190	160	150
				24	6	12	140	115	110
						6	140	115	110

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.4 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or 2308.

c. Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating. Plywood siding rated 16 on center or 24 on center shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and plywood siding 16 on center shall be used with studs spaced not more than 16 inches on center.

Committee Reason: Approved as modified as the proposal adds consistency with ASCE 7 and clarity. The modification modifies the wind speed term to be consistent with the committee actions on S9-22. (Vote: 13-0)

Final Hearing Results

S206-22 AM

S207-22

Original Proposal

IBC: TABLE 2304.6.1

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council, American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.6.1 MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} [d] (MPH)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category B	C	D
6d common (2.0" × 0.113")	1.5	24/0	3/8	16	6	12[e]	110	90	85
		24/16	7/16	16	6	12[e]	110	100	90
						6[e]	150	125	110
8d common (2.5" × 0.131")	1.75	24/16	7/16	16	6	12[e]	130	110	105
						6[e]	150	125	110
				24	6	12[e]	110	90	85
						6[e]	110	90	85

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.7 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or 2308.

c. Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating. Plywood siding rated 16 on center or 24 on center shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and plywood siding 16 on center shall be used with studs spaced not more than 16 inches on center.

d. V_{asd} shall be determined in accordance with Section 1609.3.1.

e. Where the specific gravity of the wood species used for wall framing is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, nail spacing in the field of the panel shall be multiplied by 0.67. Where the specific gravity of the wood species used for wall framing is less than 0.35, fastening of the wall sheathing shall be designed in accordance with AWC NDS.

Reason: This change recognizes the minimum specific gravity basis of 0.42 for the fastener spacing and provides a prescriptive option (i.e., multiply spacing by 0.67) for framing of species with lower specific gravity down to specific gravity equal to 0.35. Engineered design of the fastening is required when specific gravity of the species used for wall framing is less than 0.35.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, closer fastener spacing is required to provide equivalent withdrawal performance to the 0.42 specific gravity basis of the existing fastening schedule without requiring engineered design.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the new footnote adds needed direction on the prescriptive capacity for fastening of wood sheathing based on the wood specific gravity. (Vote: 13-0)

Final Hearing Results

S207-22	AS

S209-22

Original Proposal

IBC: TABLE 2304.8(2)

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.8(2) SHEATHING LUMBER, MINIMUM GRADE REQUIREMENTS: BOARD GRADE

SOLID FLOOR OR ROOF SHEATHING	SPACED ROOF SHEATHING	GRADING RULES
Utility	Standard	NLGA, PLIB/WCLIB, or WWPA
4 common or utility	3 common or standard	NLGA, PLIB/WCLIB, WWPA, NSLB or NELMA
No. 3	No. 2	SPIB
Merchantable	Construction common	RIS

Reason: Update to reflect changes in PS20-20 and consolidation of West Coast Lumber Inspection Bureau (WCLIB) under Pacific Lumber Inspection Bureau (PLIB). Northern Softwood Lumber Bureau (NLSB) has been dissolved.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change updates applicable grading rules for consistency with PS20.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal addresses the consolidation of the West Coast Lumber Inspection Bureau (WCLIB) under the Pacific Lumber Inspection Bureau (PLIB) and that the Northern Softwood Lumber Bureau (NSLB) has been dissolved. (Vote: 13-0).

Final Hearing Results

S209-22 AS

S210-22

Original Proposal

IBC: CHAPTER 23, SECTION 2304, TABLE 2304.8(3), TABLE 2304.8(5), 2308.2.3, TABLE 2308.4.1.1(1), TABLE 2308.7.2(3), TABLE 2308.7.2(4), TABLE 2308.7.2(5), TABLE 2308.7.2(6), TABLE 2308.7.3.1, CHAPTER 24, SECTION 2404, 2404.2, ASCE/SEI Chapter 35 (New)

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

CHAPTER 23 WOOD

SECTION 2304 GENERAL CONSTRUCTION REQUIREMENTS

Revise as follows:

TABLE 2304.8(3) ALLOWABLE SPANS AND LOADS FOR WOOD STRUCTURAL PANEL SHEATHING AND SINGLE-FLOOR GRADES CONTINUOUS OVER TWO OR MORE SPANS WITH STRENGTH AXIS PERPENDICULAR TO SUPPORTS[a]

SHEATHING GRADES		ROOF[b]				FLOOR[c]
		Maximum span (inches)		Load[d] (psf)		
Panel span rating roof/floor span	Panel thickness (inches)	With edge support[e]	Without edge support	Total load	Live load	Maximum span (inches)
16/0	3/8	16	16	40	30	0
20/0	3/8	20	20	40	30	0
24/0	3/8, 7/16, 1/2	24	20[f]	40	30	0
24/16	7/16, 1/2	24	24	50	40	16
32/16	15/32, 1/2, 5/8	32	28	40	30	16[g]
40/20	19/32, 5/8, 3/4, 7/8	40	32	40	30	20[g,h]
48/24	23/32, 3/4, 7/8	48	36	45	35	24
54/32	7/8, 1	54	40	45	35	32
60/32	7/8, 1 1/8	60	48	45	35	32
SINGLE FLOOR GRADES		ROOF[b]				FLOOR[c]
Panel span rating	Panel thickness (inches)	Maximum span (inches)		Load [e] (psf)		Maximum span (inches)
		With edge support[e]	Without edge support	Total load	Live load	
16 o.c.	1/2, 19/32, 5/8	24	24	50	40	16[g]
20 o.c.	19/32, 5/8, 3/4	32	32	40	30	20[g,h]
24 o.c.	23/32, 3/4	48	36	35	25	24
32 o.c.	7/8, 1	48	40	50	40	32
48 o.c.	1 3/32, 1 1/8	60	48	50	40	48

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kN/m^2.

a. Applies to panels 24 inches or wider.

b. Uniform load deflection limitations $^1/_{180}$ of span under live load plus dead load, $^1/_{240}$ under live load only.

c. Panel edges shall have approved tongue-and-groove joints or shall be supported with blocking unless $^1/_4$-inch minimum thickness underlayment or $1^1/_2$ inches of approved cellular or lightweight concrete is placed over the subfloor, or finish floor is $^3/_4$-inch wood strip. Allowable uniform load based on deflection of $^1/_{360}$ of span is 100 pounds per square foot except the span rating of 48 inches on center is based on a total load of 65 pounds per square foot.

d. Allowable load at maximum span. Where the total load includes snow, use allowable stress design snow loads.

e. Tongue-and-groove edges, panel edge clips (one midway between each support, except two equally spaced between supports 48 inches on center), lumber blocking or other. Only lumber blocking shall satisfy blocked diaphragm requirements. Where the total load includes snow, use allowable stress design snow loads.

f. For $^{1}/_{2}$-inch panel, maximum span shall be 24 inches.

g. Span is permitted to be 24 inches on center where $^{3}/_{4}$-inch wood strip flooring is installed at right angles to joist.

h. Span is permitted to be 24 inches on center for floors where $1^{1}/_{2}$ inches of cellular or lightweight concrete is applied over the panels.

TABLE 2304.8(5) ALLOWABLE LOAD (PSF) FOR WOOD STRUCTURAL PANEL ROOF SHEATHING CONTINUOUS OVER TWO OR MORE SPANS AND STRENGTH AXIS PARALLEL TO SUPPORTS (Plywood structural panels are five-ply, five-layer unless otherwise noted)[a]

PANEL GRADE	THICKNESS (inch)	MAXIMUM SPAN (inches)	LOAD AT MAXIMUM SPAN (psf)	
			Live	Total[c]
Structural I sheathing	$^{7}/_{16}$	24	20	30
	$^{15}/_{32}$	24	35[b]	45[b]
	$^{1}/_{2}$	24	40[b]	50[b]
	$^{19}/_{32}$, $^{5}/_{8}$	24	70	80
	$^{23}/_{32}$, $^{3}/_{4}$	24	90	100
Sheathing, other grades covered in DOC PS 1 or DOC PS 2	$^{7}/_{16}$	16	40	50
	$^{15}/_{32}$	24	20	25
	$^{1}/_{2}$	24	25	30
	$^{19}/_{32}$	24	40[b]	50[b]
	$^{5}/_{8}$	24	45[b]	55[b]
	$^{23}/_{32}$, $^{3}/_{4}$	24	60[b]	65[b]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kN/m^2.

a. Uniform load deflection limitations $^{1}/_{180}$ of span under live load plus dead load, $^{1}/_{240}$ under live load only. Edges shall be blocked with lumber or other approved type of edge supports.

b. For composite and four-ply plywood structural panel, load shall be reduced by 15 pounds per square foot.

c. Where the total load includes snow, use allowable stress design snow loads.

2308.2.3 Allowable loads. *Loads* shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average *dead loads* shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, *exterior walls*, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section 2308.6.10, stone or masonry *veneer* up to the less of 5 inches (127 mm) thick or 50 pounds per square foot (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2439) permitted for *gable* ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. *Live loads* shall not exceed 40 psf (1916 N/m^2) for floors.

   Exception: *Live loads* for concrete slab-on-ground floors in *Risk Categories* I and II shall be not more than 125 psf.

3. Ground snow *loads* shall not exceed 50 psf (2395 N/m^2).

Revise as follows:

TABLE 2308.4.1.1(1) HEADER AND GIRDER SPANS[a, b] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir and required number of jack studs)

Portions of table not shown remain unchanged.

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD, $p_{g(asd)}$ (psf)[e]																	
		30						50						70					
		Building width[c] (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span[f]	NJ[g]	Span[f]	NJ[g]	Span[f]	NJ[g]	Span[f]	NJ[g]	Span[f]	NJ[g]	Span[f]	NJ[g]	Span[f]	NJ[g]	Span[f]	NJ[d]	Span[f]	NJ[d]
Roof and ceiling	1-2 × 6	4-0	1	3-1	2	2-7	2	3-5	1	2-8	2	2-3	2	3-0	2	2-4	2	2-0	2
	1-2 × 8	5-1	2	3-11	2	3-3	2	4-4	2	3-4	2	2-10	2	3-10	2	3-0	2	2-6	3
	1-2 × 10	6-0	2	4-8	2	3-11	2	5-2	2	4-0	2	3-4	3	4-7	2	3-6	3	3-0	3
	1-2 × 12	7-1	2	5-5	2	4-7	3	6-1	2	4-8	3	3-11	3	5-5	2	4-2	3	3-6	3
	2-2 × 4	4-0	1	3-1	1	2-7	1	3-5	1	2-7	1	2-2	1	3-0	1	2-4	1	2-0	1
	2-2 × 6	6-0	1	4-7	1	3-10	1	5-1	1	3-11	1	3-3	2	4-6	1	3-6	2	2-11	2
	2-2 × 8	7-7	1	5-9	1	4-10	2	6-5	1	5-0	2	4-2	2	5-9	1	4-5	2	3-9	2
	2-2 × 10	9-0	1	6-10	2	5-9	2	7-8	2	5-11	2	4-11	2	6-9	2	5-3	2	4-5	2
	2-2 × 12	10-7	2	8-1	2	6-10	2	9-0	2	6-11	2	5-10	2	8-0	2	6-2	2	5-2	3
	3-2 × 8	9-5	1	7-3	1	6-1	1	8-1	1	6-3	1	5-3	2	7-2	1	5-6	2	4-8	2
	3-2 × 10	11-3	1	8-7	1	7-3	2	9-7	1	7-4	2	6-2	2	8-6	1	6-7	2	5-6	2
	3-2 × 12	13-2	1	10-1	2	8-6	2	11-3	2	8-8	2	7-4	2	10-0	2	7-9	2	6-6	2
	4-2 × 8	10-11	1	8-4	1	7-0	1	9-4	1	7-2	1	6-0	1	8-3	1	6-4	1	5-4	2
	4-2 × 10	12-11	1	9-11	1	8-4	1	11-1	1	8-6	1	7-2	2	9-10	1	7-7	2	6-4	2
	4-2 × 12	15-3	1	11-8	1	9-10	2	13-0	1	10-0	2	8-5	2	11-7	1	8-11	2	7-6	2
Roof, ceiling and one center-bearing floor	1-2 × 6	3-3	1	2-7	2	2-2	2	3-0	2	2-4	2	2-0	2	2-9	2	2-2	2	1-10	2
	1-2 × 8	4-1	2	3-3	2	2-9	2	3-9	2	3-0	2	2-6	3	3-6	2	2-9	2	2-4	3
	1-2 × 10	4-11	2	3-10	2	3-3	3	4-6	2	3-6	3	3-0	3	4-1	2	3-3	3	2-9	3
	1-2 × 12	5-9	2	4-6	3	3-10	3	5-3	2	4-2	3	3-6	3	4-10	3	3-10	3	3-3	4
	2-2 × 4	3-3	1	2-6	1	2-2	1	3-0	1	2-4	1	2-0	1	2-8	1	2-2	1	1-10	1
	2-2 × 6	4-10	1	3-9	1	3-3	2	4-5	1	3-6	2	3-0	2	4-1	1	3-3	2	2-9	2
	2-2 × 8	6-1	1	4-10	2	4-1	2	5-7	2	4-5	2	3-9	2	5-2	2	4-1	2	3-6	2
	2-2 × 10	7-3	2	5-8	2	4-10	2	6-8	2	5-3	2	4-5	2	6-1	2	4-10	2	4-1	2
	2-2 × 12	8-6	2	6-8	2	5-8	2	7-10	2	6-2	2	5-3	3	7-2	2	5-8	2	4-10	3
	3-2 × 8	7-8	1	6-0	1	5-1	2	7-0	1	5-6	2	4-8	2	6-5	1	5-1	2	4-4	2
	3-2 × 10	9-1	1	7-2	2	6-1	2	8-4	1	6-7	2	5-7	2	7-8	2	6-1	2	5-2	2
	3-2 × 12	10-8	2	8-5	2	7-2	2	9-10	2	7-8	2	6-7	2	9-0	2	7-1	2	6-1	2
	4-2 × 8	8-10	1	6-11	1	5-11	1	8-1	1	6-4	1	5-5	2	7-5	1	5-11	1	5-0	2
	4-2 × 10	10-6	1	8-3	2	7-0	2	9-8	1	7-7	2	6-5	2	8-10	1	7-0	2	6-0	2
	4-2 × 12	12-4	1	9-8	2	8-3	2	11-4	2	8-11	2	7-7	2	10-4	2	8-3	2	7-0	2
Roof, ceiling and one clear span floor	1-2 × 6	2-11	2	2-3	2	1-11	2	2-9	2	2-1	2	1-9	2	2-7	2	2-0	2	1-8	2
	1-2 × 8	3-9	2	2-10	2	2-5	3	3-6	2	2-8	2	2-3	3	3-3	2	2-6	3	2-2	3
	1-2 × 10	4-5	2	3-5	3	2-10	3	4-2	2	3-2	3	2-8	3	3-11	2	3-0	3	2-6	3
	1-2 × 12	5-2	2	4-0	3	3-4	3	4-10	3	3-9	3	3-2	4	4-7	3	3-6	3	3-0	4
	2-2 × 4	2-11	1	2-3	1	1-10	1	2-9	1	2-1	1	1-9	1	2-7	1	2-0	1	1-8	1
	2-2 × 6	4-4	1	3-4	2	2-10	2	4-1	1	3-2	2	2-8	2	3-10	1	3-0	2	2-6	2
	2-2 × 8	5-6	2	4-3	2	3-7	2	5-2	2	4-0	2	3-4	2	4-10	2	3-9	2	3-2	2
	2-2 × 10	6-7	2	5-0	2	4-2	2	6-1	2	4-9	2	4-0	2	5-9	2	4-5	2	3-9	3
	2-2 × 12	7-9	2	5-11	2	4-11	3	7-2	2	5-7	2	4-8	3	6-9	2	5-3	3	4-5	3
	3-2 × 8	6-11	1	5-3	2	4-5	2	6-5	1	5-0	2	4-2	2	6-1	1	4-8	2	4-0	2
	3-2 × 10	8-3	2	6-3	2	5-3	2	7-8	2	5-11	2	5-0	2	7-3	2	5-7	2	4-8	2
	3-2 × 12	9-8	2	7-5	2	6-2	2	9-0	2	7-0	2	5-10	2	8-6	2	6-7	2	5-6	3
	4-2 × 8	8-0	1	6-1	1	5-1	2	7-5	1	5-9	2	4-10	2	7-0	1	5-5	2	4-7	2
	4-2 × 10	9-6	1	7-3	2	6-1	2	8-10	1	6-10	2	5-9	2	8-4	1	6-5	2	5-5	2
	4-2 × 12	11-2	2	8-6	2	7-2	2	10-5	2	8-0	2	6-9	2	9-10	2	7-7	2	6-5	2
Roof, ceiling and two center-bearing floors	1-2 × 6	2-8	2	2-1	2	1-10	2	2-7	2	2-0	2	1-9	2	2-5	2	1-11	2	1-8	2
	1-2 × 8	3-5	2	2-8	2	2-4	3	3-3	2	2-7	2	2-2	3	3-1	2	2-5	3	2-1	3
	1-2 × 10	4-0	2	3-2	3	2-9	3	3-10	2	3-1	3	2-7	3	3-8	2	2-11	3	2-5	3
	1-2 × 12	4-9	3	3-9	3	3-2	4	4-6	3	3-7	3	3-1	4	4-3	3	3-5	3	2-11	4
	2-2 × 4	2-8	1	2-1	1	1-9	1	2-6	1	2-0	1	1-8	1	2-5	1	1-11	1	1-7	1
	2-2 × 6	4-0	1	3-2	2	2-8	2	3-9	1	3-0	2	2-7	2	3-7	1	2-10	2	2-5	2
	2-2 × 8	5-0	2	4-0	2	3-5	2	4-10	2	3-10	2	3-3	2	4-7	2	3-7	2	3-1	2
	2-2 × 10	6-0	2	4-9	2	4-0	2	5-8	2	4-6	2	3-10	3	5-5	2	4-3	2	3-8	3
	2-2 × 12	7-0	2	5-7	2	4-9	3	6-8	2	5-4	3	4-6	3	6-4	2	5-0	3	4-3	3
	3-2 × 8	6-4	1	5-0	2	4-3	2	6-0	1	4-9	2	4-1	2	5-8	2	4-6	2	3-10	2
	3-2 × 10	7-6	2	5-11	2	5-1	2	7-1	2	5-8	2	4-10	2	6-9	2	5-4	2	4-7	2
	3-2 × 12	8-10	2	7-0	2	5-11	2	8-5	2	6-8	2	5-8	3	8-0	2	6-4	2	5-4	3
	4-2 × 8	7-3	1	5-9	1	4-11	2	6-11	1	5-6	2	4-8	2	6-7	1	5-2	2	4-5	2
	4-2 × 10	8-8	1	6-10	2	5-10	2	8-3	2	6-6	2	5-7	2	7-10	2	6-2	2	5-3	2
	4-2 × 12	10-2	2	8-1	2	6-10	2	9-8	2	7-8	2	6-7	2	9-2	2	7-3	2	6-2	2
Roof, ceiling and two clear span floors	1-2 × 6	2-3	2	1-9	2	1-5	2	2-3	2	1-9	2	1-5	3	2-2	2	1-8	2	1-5	3
	1-2 × 8	2-10	2	2-2	3	1-10	3	2-10	2	2-2	3	1-10	3	2-9	2	2-1	3	1-10	3
	1-2 × 10	3-4	2	2-7	3	2-2	3	3-4	3	2-7	3	2-2	4	3-3	3	2-6	3	2-2	4
	1-2 × 12	4-0	3	3-0	3	2-7	4	4-0	3	3-0	4	2-7	4	3-10	3	3-0	4	2-6	4
	2-2 × 4	2-3	1	1-8	1	1-4	1	2-3	1	1-8	1	1-4	1	2-2	1	1-8	1	1-4	2
	2-2 × 6	3-4	1	2-6	2	2-2	2	3-4	2	2-6	2	2-2	2	3-3	2	2-6	2	2-1	2
	2-2 × 8	4-3	2	3-3	2	2-8	2	4-3	2	3-3	2	2-8	2	4-1	2	3-2	2	2-8	3

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD, p (psf)																	
		30						50						70					
		Building width (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ
	2-2 × 10	5-0	2	3-10	2	3-2	3	5-0	2	3-10	2	3-2	3	4-10	2	3-9	3	3-2	3
	2-2 × 12	5-11	2	4-6	3	3-9	3	5-11	2	4-6	3	3-9	3	5-8	2	4-5	3	3-9	3
	3-2 × 8	5-3	1	4-0	2	3-5	2	5-3	2	4-0	2	3-5	2	5-1	2	3-11	2	3-4	2
	3-2 × 10	6-3	2	4-9	2	4-0	2	6-3	2	4-9	2	4-0	2	6-1	2	4-8	2	4-0	3
	3-2 × 12	7-5	2	5-8	2	4-9	3	7-5	2	5-8	2	4-9	3	7-2	2	5-6	3	4-8	3
	4-2 × 8	6-1	1	4-8	2	3-11	2	6-1	1	4-8	2	3-11	2	5-11	1	4-7	2	3-10	2
	4-2 × 10	7-3	2	5-6	2	4-8	2	7-3	2	5-6	2	4-8	2	7-0	2	5-5	2	4-7	2
	4-2 × 12	8-6	2	6-6	2	5-6	2	8-6	2	6-6	2	5-6	2	8-3	2	6-4	2	5-4	3

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine and spruce-pine fir.

c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

e. Use 30 psf allowable stress design ground snow load for cases in which allowable stress design ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

f. Spans are calculated assuming the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), tabulated spans for headers consisting of 2 × 8, 2 × 10, or 2 × 12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.

TABLE 2308.7.2(3) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $p_{g(asd)}$ = 30 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	10-0	15-9	20-9	Note b	Note b	10-0	15-9	20-1	24-6	Note b
	Douglas Fir-Larch	#1	9-8	14-9	18-8	22-9	Note b	9-0	13-2	16-8	20-4	23-7
	Douglas Fir-Larch	#2	9-5	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Douglas Fir-Larch	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Hem-Fir	SS	9-6	14-10	19-7	25-0	Note b	9-6	14-10	19-7	24-1	Note b
	Hem-Fir	#1	9-3	14-4	18-2	22-2	25-9	8-9	12-10	16-3	19-10	23-0
	Hem-Fir	#2	8-10	13-7	17-2	21-0	24-4	8-4	12-2	15-4	18-9	21-9
	Hem-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern Pine	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	20-5	25-4	Note b
	Southern Pine	#1	9-6	14-10	19-0	22-3	26-0	9-0	13-5	17-0	19-11	23-7
	Southern Pine	#2	8-7	12-11	16-4	19-5	22-10	7-8	11-7	14-8	17-4	20-5
	Southern Pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-Pine-Fir	SS	9-3	14-7	19-2	24-6	Note b	9-3	14-7	18-8	22-9	Note b
	Spruce-Pine-Fir	#1	9-1	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#2	9-1	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas Fir-Larch	SS	9-1	14-4	18-10	23-9	Note b	9-1	13-9	17-5	21-3	24-8
	Douglas Fir-Larch	#1	8-9	12-9	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas Fir-Larch	#2	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Douglas Fir-Larch	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Hem-Fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	13-6	17-1	20-10	24-2
	Hem-Fir	#1	8-5	12-5	15-9	19-3	22-3	7-7	11-1	14-1	17-2	19-11
	Hem-Fir	#2	8-0	11-9	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern Pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-5	21-11	25-11

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4 (ft. - in.)	DEAD LOAD = 10 psf 2 × 6 (ft. - in.)	DEAD LOAD = 10 psf 2 × 8 (ft. - in.)	DEAD LOAD = 10 psf 2 × 10 (ft. - in.)	DEAD LOAD = 10 psf 2 × 12 (ft. - in.)	DEAD LOAD = 20 psf 2 × 4 (ft. - in.)	DEAD LOAD = 20 psf 2 × 6 (ft. - in.)	DEAD LOAD = 20 psf 2 × 8 (ft. - in.)	DEAD LOAD = 20 psf 2 × 10 (ft. - in.)	DEAD LOAD = 20 psf 2 × 12 (ft. - in.)
			Maximum rafter spans									
	Southern Pine	#1	8-7	13-0	16-6	19-3	22-10	7-10	11-7	14-9	17-3	20-5
	Southern Pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern Pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-Pine-Fir	SS	8-5	13-3	17-5	22-1	25-7	8-5	12-9	16-2	19-9	22-10
	Spruce-Pine-Fir	#1	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#2	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
19.2	Douglas Fir-Larch	SS	8-7	13-6	17-9	21-8	25-2	8-7	12-6	15-10	19-5	22-6
	Douglas Fir-Larch	#1	7-11	11-8	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-Larch	#2	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Douglas Fir-Larch	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Hem-Fir	SS	8-1	12-9	16-9	21-4	24-8	8-1	12-4	15-7	19-1	22-1
	Hem-Fir	#1	7-9	11-4	14-4	17-7	20-4	6-11	10-2	12-10	15-8	18-2
	Hem-Fir	#2	7-4	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3
	Hem-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern Pine	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	16-10	20-0	23-7
	Southern Pine	#1	8-0	11-10	15-1	17-7	20-11	7-1	10-7	13-5	15-9	18-8
	Southern Pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern Pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-Pine-Fir	SS	7-11	12-5	16-5	20-2	23-4	7-11	11-8	14-9	18-0	20-11
	Spruce-Pine-Fir	#1	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#2	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
24	Douglas Fir-Larch	SS	7-11	12-6	15-10	19-5	22-6	7-8	11-3	14-2	17-4	20-1
	Douglas Fir-Larch	#1	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas Fir-Larch	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Hem-Fir	SS	7-6	11-10	15-7	19-1	22-1	7-6	11-0	13-11	17-0	19-9
	Hem-Fir	#1	6-11	10-2	12-10	15-8	18-2	6-2	9-1	11-6	14-0	16-3
	Hem-Fir	#2	6-7	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Southern Pine	SS	7-10	12-3	16-2	20-0	23-7	7-10	11-10	15-0	17-11	21-2
	Southern Pine	#1	7-1	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-Pine-Fir	SS	7-4	11-7	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#1	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

b. Span exceeds 26 feet in length.

TABLE 2308.7.2(4) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $p_{g(asd)}$ = 50 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4 (ft. - in.)	DEAD LOAD = 10 psf 2 × 6 (ft. - in.)	DEAD LOAD = 10 psf 2 × 8 (ft. - in.)	DEAD LOAD = 10 psf 2 × 10 (ft. - in.)	DEAD LOAD = 10 psf 2 × 12 (ft. - in.)	DEAD LOAD = 20 psf 2 × 4 (ft. - in.)	DEAD LOAD = 20 psf 2 × 6 (ft. - in.)	DEAD LOAD = 20 psf 2 × 8 (ft. - in.)	DEAD LOAD = 20 psf 2 × 10 (ft. - in.)	DEAD LOAD = 20 psf 2 × 12 (ft. - in.)
			Maximum rafter spans[a]									
12	Douglas Fir-Larch	SS	8-5	13-3	17-6	22-4	26-0	8-5	13-3	17-0	20-9	24-0
	Douglas Fir-larch	#1	8-2	12-0	15-3	18-7	21-7	7-7	11-2	14-1	17-3	20-0
	Douglas Fir-larch	#2	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-larch	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Hem-Fir	SS	8-0	12-6	16-6	21-1	25-6	8-0	12-6	16-6	20-4	23-7

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4 (ft. - in.)	DEAD LOAD = 10 psf 2 × 6 (ft. - in.)	DEAD LOAD = 10 psf 2 × 8 (ft. - in.)	DEAD LOAD = 10 psf 2 × 10 (ft. - in.)	DEAD LOAD = 10 psf 2 × 12 (ft. - in.)	DEAD LOAD = 20 psf 2 × 4 (ft. - in.)	DEAD LOAD = 20 psf 2 × 6 (ft. - in.)	DEAD LOAD = 20 psf 2 × 8 (ft. - in.)	DEAD LOAD = 20 psf 2 × 10 (ft. - in.)	DEAD LOAD = 20 psf 2 × 12 (ft. - in.)
			Maximum rafter spans									
	Hem-Fir	#1	7-10	11-9	14-10	18-1	21-0	7-5	10-10	13-9	16-9	19-5
	Hem-Fir	#2	7-5	11-1	14-0	17-2	19-11	7-0	10-3	13-0	15-10	18-5
	Hem-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern Pine	SS	8-4	13-1	17-2	21-11	Note b	8-4	13-1	17-2	21-5	25-3
	Southern Pine	#1	8-0	12-3	15-6	18-2	21-7	7-7	11-4	14-5	16-10	20-0
	Southern Pine	#2	7-0	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern Pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-Pine-Fir	SS	7-10	12-3	16-2	20-8	24-1	7-10	12-3	15-9	19-3	22-4
	Spruce-Pine-Fir	#1	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#2	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas Fir-Larch	SS	7-8	12-1	15-10	19-5	22-6	7-8	11-7	14-8	17-11	20-10
	Douglas Fir-Larch	#1	7-1	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas Fir-Larch	#2	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Hem-Fir	SS	7-3	11-5	15-0	19-1	22-1	7-3	11-5	14-5	17-8	20-5
	Hem-Fir	#1	6-11	10-2	12-10	15-8	18-2	6-5	9-5	11-11	14-6	16-10
	Hem-Fir	#2	6-7	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Southern Pine	SS	7-6	11-10	15-7	19-11	23-7	7-6	11-10	15-7	18-6	21-10
	Southern Pine	#1	7-1	10-7	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-Pine-Fir	SS	7-1	11-2	14-8	18-0	20-11	7-1	10-9	13-8	15-11	19-4
	Spruce-Pine-Fir	#1	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#2	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
19.2	Douglas Fir-Larch	SS	7-3	11-4	14-6	17-8	20-6	7-3	10-7	13-5	16-5	19-0
	Douglas Fir-Larch	#1	6-6	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas Fir-Larch	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Douglas Fir-Larch	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Hem-Fir	SS	6-10	10-9	14-2	17-5	20-2	6-10	10-5	13-2	16-1	18-8
	Hem-Fir	#1	6-4	9-3	11-9	14-4	16-7	5-10	8-7	10-10	13-3	15-5
	Hem-Fir	#2	6-0	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern Pine	SS	7-1	11-2	14-8	18-3	21-7	7-1	11-2	14-2	16-11	20-0
	Southern Pine	#1	6-6	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern Pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern Pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-Pine-Fir	SS	6-8	10-6	13-5	16-5	19-1	6-8	9-10	12-5	15-3	17-8
	Spruce-Pine-Fir	#1	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Douglas Fir-Larch	SS	6-8	10-3	13-0	15-10	18-4	6-6	9-6	12-0	14-8	17-0
	Douglas Fir-Larch	#1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas Fir-Larch	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Douglas Fir-Larch	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Hem-Fir	SS	6-4	9-11	12-9	15-7	18-0	6-4	9-4	11-9	14-5	16-8
	Hem-Fir	#1	5-8	8-3	10-6	12-10	14-10	5-3	7-8	9-9	11-10	13-9
	Hem-Fir	#2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern Pine	SS	6-7	10-4	13-8	16-4	19-3	6-7	10-0	12-8	15-2	17-10
	Southern Pine	#1	5-10	8-8	11-0	12-10	15-3	5-5	8-0	10-2	11-11	14-1
	Southern Pine	#2	5-0	7-5	9-5	11-3	13-2	4-7	6-11	8-9	10-5	12-3
	Southern Pine	#3	3-10	5-8	7-1	8-8	10-3	3-6	5-3	6-7	8-0	9-6
	Spruce-Pine-Fir	SS	6-2	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Spruce-Pine-Fir	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

b. Span exceeds 26 feet in length.

TABLE 2308.7.2(5) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $p_{g(asd)}$ = 30 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	9-1	14-4	18-10	24-1	Note b	9-1	14-4	18-10	24-1	Note b
	Douglas Fir-Larch	#1	8-9	13-9	18-2	22-9	Note b	8-9	13-2	16-8	20-4	23-7
	Douglas Fir-Larch	#2	8-7	13-6	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Douglas Fir-Larch	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Hem-Fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	13-6	17-10	22-9	Note b
	Hem-Fir	#1	8-5	13-3	17-5	22-2	25-9	8-5	12-10	16-3	19-10	23-0
	Hem-Fir	#2	8-0	12-7	16-7	21-0	24-4	8-0	12-2	15-4	18-9	21-9
	Hem-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern Pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	23-8	Note b
	Southern Pine	#1	8-7	13-6	17-10	22-3	Note b	8-7	13-5	17-0	19-11	23-7
	Southern Pine	#2	8-3	12-11	16-4	19-5	22-10	7-8	11-7	14-8	17-4	20-5
	Southern Pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-Pine-Fir	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	17-5	22-3	Note b
	Spruce-Pine-Fir	#1	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#2	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas Fir-Larch	SS	8-3	13-0	17-2	21-10	Note b	8-3	13-0	17-2	21-3	24-8
	Douglas Fir-Larch	#1	8-0	12-6	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas Fir-Larch	#2	7-10	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Douglas Fir-Larch	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Hem-Fir	SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	20-8	24-2
	Hem-Fir	#1	7-8	12-0	15-9	19-3	22-3	7-7	11-1	14-1	17-2	19-11
	Hem-Fir	#2	7-3	11-5	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern Pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	21-6	25-11
	Southern Pine	#1	7-10	12-3	16-2	19-3	22-10	7-10	11-7	14-9	17-3	20-5
	Southern Pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern Pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-Pine-Fir	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	19-9	22-10
	Spruce-Pine-Fir	#1	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#2	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
19.2	Douglas Fir-Larch	SS	7-9	12-3	16-1	20-7	25-0	7-9	12-3	15-10	19-5	22-6
	Douglas Fir-Larch	#1	7-6	11-8	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-Larch	#2	7-4	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Douglas Fir-Larch	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Hem-Fir	SS	7-4	11-7	15-3	19-5	23-7	7-4	11-7	15-3	19-1	22-1
	Hem-Fir	#1	7-2	11-4	14-4	17-7	20-4	6-11	10-2	12-10	15-8	18-2
	Hem-Fir	#2	6-10	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3
	Hem-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern Pine	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	20-0	23-7
	Southern Pine	#1	7-4	11-7	15-1	17-7	20-11	7-1	10-7	13-5	15-9	18-8
	Southern Pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern Pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-Pine-Fir	SS	7-2	11-4	14-11	19-0	23-1	7-2	11-4	14-9	18-0	20-11
	Spruce-Pine-Fir	#1	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#2	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-Pine-Fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
24	Douglas Fir-Larch	SS	7-3	11-4	15-0	19-1	22-6	7-3	11-3	14-2	17-4	20-1
	Douglas Fir-Larch	#1	7-0	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas Fir-Larch	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Hem-Fir	SS	6-10	10-9	14-2	18-0	21-11	6-10	10-9	13-11	17-0	19-9
	Hem-Fir	#1	6-8	10-2	12-10	15-8	18-2	6-2	9-1	11-6	14-0	16-3

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
	Hem-Fir	#2	6-4	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Southern Pine	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	17-11	21-2
	Southern Pine	#1	6-10	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-Pine-Fir	SS	6-8	10-6	13-10	17-8	20-11	6-8	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#1	6-6	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#2	6-6	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

b. Span exceeds 26 feet in length.

TABLE 2308.7.2(6) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load, $p_{g(asd)}$ = 50 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch	SS	7-8	12-1	15-11	20-3	24-8	7-8	12-1	15-11	20-3	24-0
	Douglas Fir-Larch	#1	7-5	11-7	15-3	18-7	21-7	7-5	11-2	14-1	17-3	20-0
	Douglas Fir-Larch	#2	7-3	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Douglas Fir-Larch	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Hem-Fir	SS	7-3	11-5	15-0	19-2	23-4	7-3	11-5	15-0	19-2	23-4
	Hem-Fir	#1	7-1	11-2	14-8	18-1	21-0	7-1	10-10	13-9	16-9	19-5
	Hem-Fir	#2	6-9	10-8	14-0	17-2	19-11	6-9	10-3	13-0	15-10	18-5
	Hem-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern Pine	SS	7-6	11-10	15-7	19-11	24-3	7-6	11-10	15-7	19-11	24-3
	Southern Pine	#1	7-3	11-5	15-0	18-2	21-7	7-3	11-4	14-5	16-10	20-0
	Southern Pine	#2	6-11	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern Pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-Pine-Fir	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	18-9	22-4
	Spruce-Pine-Fir	#1	6-11	10-11	14-3	17-5	20-2	6-11	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#2	6-11	10-11	14-3	17-5	20-2	6-11	10-5	13-2	16-1	18-8
	Spruce-Pine-Fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas Fir-Larch	SS	7-0	11-0	14-5	18-5	22-5	7-0	11-0	14-5	17-11	20-10
	Douglas Fir-Larch	#1	6-9	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas Fir-Larch	#2	6-7	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Douglas Fir-Larch	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Hem-Fir	SS	6-7	10-4	13-8	17-5	21-2	6-7	10-4	13-8	17-5	20-5
	Hem-Fir	#1	6-5	10-2	12-10	15-8	18-2	6-5	9-5	11-11	14-6	16-10
	Hem-Fir	#2	6-2	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Southern Pine	SS	6-10	10-9	14-2	18-1	22-0	6-10	10-9	14-2	18-1	21-10
	Southern Pine	#1	6-7	10-4	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern Pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern Pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-Pine-Fir	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-8	19-4
	Spruce-Pine-Fir	#1	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#2	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-Pine-Fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
19.2	Douglas Fir-Larch	SS	6-7	10-4	13-7	17-4	20-6	6-7	10-4	13-5	16-5	19-0
	Douglas Fir-Larch	#1	6-4	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas Fir-Larch	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Douglas Fir-Larch	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
	Hem-Fir	SS	6-2	9-9	12-10	16-5	19-11	6-2	9-9	12-10	16-1	18-8
	Hem-Fir	#1	6-1	9-3	11-9	14-4	16-7	5-10	8-7	10-10	13-3	15-5
	Hem-Fir	#2	5-9	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern Pine	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-11	20-0
	Southern Pine	#1	6-2	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern Pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern Pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-Pine-Fir	SS	6-1	9-6	12-7	16-0	19-1	6-1	9-6	12-5	15-3	17-8
	Spruce-Pine-Fir	#1	5-11	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#2	5-11	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Douglas Fir-Larch	SS	6-1	9-7	12-7	15-10	18-4	6-1	9-6	12-0	14-8	17-0
	Douglas Fir-Larch	#1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas Fir-Larch	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Douglas Fir-Larch	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Hem-Fir	SS	5-9	9-1	11-11	15-2	18-0	5-9	9-1	11-9	14-5	15-11
	Hem-Fir	#1	5-8	8-3	10-6	12-10	14-10	5-3	7-8	9-9	11-10	13-9
	Hem-Fir	#2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern Pine	SS	6-0	9-5	12-5	15-10	19-3	6-0	9-5	12-5	15-2	17-10
	Southern Pine	#1	5-9	8-8	11-0	12-10	15-3	5-5	8-0	10-2	11-11	14-1
	Southern Pine	#2	5-0	7-5	9-5	11-3	13-2	4-7	6-11	8-9	10-5	12-3
	Southern Pine	#3	3-10	5-8	7-1	8-8	10-3	3-6	5-3	6-7	8-0	9-6
	Spruce-Pine-Fir	SS	5-8	8-10	11-8	14-8	17-1	5-8	8-10	11-2	13-7	15-9
	Spruce-Pine-Fir	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table 2308.7.2(7).

TABLE 2308.7.3.1 RAFTER TIE CONNECTIONS[i]

RAFTER SLOPE	TIE SPACING (inches)	LIVE LOAD ONLY[g]			GROUND SNOW LOAD, $p_{g(asd)}$ (pounds per square foot)					
					30 pounds per square foot			50 pounds per square foot		
		Roof span (feet)								
		12	24	36	12	24	36	12	24	36
		Required number of 16d common ($3^1/_2''$ x 0.162″) nails per connection[a, b, c, d, e, f, h]								
3:12	12	3	5	8	3	6	9	5	9	13
	16	4	7	10	4	8	12	6	12	17
	19.2	4	8	12	5	10	14	7	14	21
	24	**5**	10	15	6	12	18	9	17	26
	32	7	13	20	8	16	24	12	23	34
	48	10	20	29	12	24	35	17	34	51
4:12	12	3	4	6	3	5	7	4	7	10
	16	3	5	8	3	6	9	5	9	13
	19.2	3	6	9	4	7	**11**	6	11	16

	24	4	8	11	5	9	13	7	13	19
	32	5	10	15	6	12	18	9	17	26
	48	8	15	22	9	18	26	13	26	38
5:12	12	3	3	5	3	4	6	3	6	8
	16	3	4	6	3	5	7	4	7	11
	19.2	3	5	7	3	6	9	5	9	13
	24	3	6	9	4	7	11	6	11	16
	32	4	8	12	5	10	14	7	14	21
	48	6	12	18	7	14	21	11	21	31
7:12	12	3	3	4	3	3	4	3	4	6
	16	3	3	5	3	4	5	3	5	8
	19.2	3	4	5	3	4	6	3	6	9
	24	3	5	7	3	5	8	4	8	11
	32	3	6	9	4	7	10	5	10	15
	48	5	9	13	5	10	15	8	15	22
9:12	12	3	3	3	3	3	3	3	3	5
	16	3	3	4	3	3	4	3	4	6
	19.2	3	3	4	3	4	5	3	5	7
	24	3	4	5	3	4	6	3	6	9
	32	3	5	7	3	6	8	4	8	12
	48	4	7	10	4	8	12	6	12	17
12:12	12	3	3	3	3	3	3	3	3	4
	16	3	3	3	3	3	3	3	3	5
	19.2	3	3	3	3	3	4	3	4	6
	24	3	3	4	3	3	5	3	5	7
	32	3	4	5	3	4	6	3	6	9
	48	3	5	8	3	6	9	5	9	13

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 47.8 N/m^2.

a. 10d common (3″ x 0.148″) nails shall be permitted to be substituted for 16d common ($3^1/_2$" × 0.162″) nails where the required number of nails is taken as 1.2 times the required number of 16d common nails, rounded up to the next full nail.

b. Rafter tie heel joint connections are not required where the ridge is supported by a load-bearing wall, header or ridge beam.

c. Where intermediate support of the rafter is provided by vertical struts or purlins to a load-bearing wall, the tabulated heel joint connection requirements are permitted to be reduced proportionally to the reduction in span.

d. Equivalent nailing patterns are required for ceiling joist to ceiling joist lap splices.

e. Connected members shall be of sufficient size to prevent splitting due to nailing.

f. For allowable stress design snow loads less than 30 pounds per square foot, the required number of nails is permitted to be reduced by multiplying by the ratio of actual snow load plus 10 divided by 40, but not less than the number required for no snow load.

g. Applies to roof live load of 20 psf or less.

h. Tabulated heel joint connection requirements assume that ceiling joists or rafter ties are located at the bottom of the attic space. Where ceiling joists or rafter ties are located higher in the attic, heel joint connection requirements shall be increased by the adjustment factors in Table 2308.7.3.1(1).

i. Tabulated requirements are based on 10 psf roof dead load in combination with the specified roof snow load and roof live load.

CHAPTER 24 GLASS AND GLAZING

SECTION 2404
WIND, SNOW, SEISMIC AND DEAD LOADS ON GLASS

Revise as follows:

2404.2 Sloped glass. Glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, *sunrooms*, sloped roofs and other exterior applications shall be designed to resist the most critical combinations of loads determined by Equations 24-2, 24-3 and 24-4.

$F_g = 0.6W_o - D$ **(Equation 24-2)**

$F_g = 0.6W_i + D +$ ~~0.5~~ 0.35S **(Equation 24-3)**

$F_g = 0.3W_i + D +$ 0.7S **(Equation 24-4)**

where:

D = Glass *dead load* psf (kN/m^2).

For glass sloped 30 degrees (0.52 rad) or less from horizontal,

= 13 t_g (For SI: 0.0245 t_g).

For glass sloped more than 30 degrees (0.52 rad) from horizontal,

= 13 t_g cos θ (For SI: 0.0245 t_g cos θ).

F_g = Total *load*, psf (kN/m^2) on glass.

S = Snow *load*, psf (kN/m^2) as determined in Section 1608 from the reliability-targeted (strength-based) maps in Figures 1608.2(1) through 1608.2(4).

t_g = Total glass thickness, inches (mm) of glass panes and plies.

W_i = Inward wind force, psf (kN/m^2) due to basic design *wind speed*, *V*, as calculated in Section 1609.

W_o = Outward wind force, psf (kN/m^2) due to basic design wind speed, *V*, as calculated in Section 1609.

θ = Angle of slope from horizontal.

Exception: The performance grade rating of *unit skylights* and *tubular daylighting devices* shall be determined in accordance with Section 2405.5.

The design of sloped glazing shall be based on Equation 24-5.

$F_g \le F_{ga}$ **(Equation 24-5)**

where:

F_g = Total *load* on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ga} = Short duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equations 24-2 and 24-3; or the long duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equation 24-4.

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.
This proposal is a companion to the ASCE proposal to update the ground snow provisions in Section 1608.2 to the reliability-targeted (strength-based) maps.

This proposal includes coordination items for all existing allowable stress design tables to use the newly defined allowable stress design snow load, $p_{g(asd)}$, as described in the new Section 1602.1 and covered by Section 1608.2.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a coordination proposal intended to maintain the tables and equations using allowable stress design loads. Therefore, this change will not result in any cost impacts.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2308.2.3 Allowable loads. *Loads* shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average *dead loads* shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, *exterior walls*, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section 2308.6.10, stone or masonry*veneer* up to the less of 5 inches (127 mm) thick or 50 pounds per square foot (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2439) permitted for *gable* ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. *Live loads* shall not exceed 40 psf (1916 N/m^2) for floors.

   Exception: *Live loads* for concrete slab-on-ground floors in*Risk Categories* I and II shall be not more than 125 psf (5985 N/m^2).

3. Allowable stress design ground ~~Ground~~ snow *loads*, $p_{g(asd)}$ shall not exceed 50 psf (2395 N/m^2).

TABLE 2308.4.1.1(1) HEADER AND GIRDER SPANS[a, b] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir and required number of jack studs)

Portions of table not shown remain unchanged.

<table>
<tr><td rowspan="5">GIRDERS AND HEADERS SUPPORTING</td><td rowspan="5">SIZE</td><td colspan="18">ALLOWABLE STRESS DESIGN GROUND SNOW LOAD, $p_{g(asd)}$ (psf)[e]</td></tr>
<tr><td colspan="6">30</td><td colspan="6">50</td><td colspan="6">70</td></tr>
<tr><td colspan="18">Building width[c] (feet)</td></tr>
<tr><td colspan="2">12</td><td colspan="2">24</td><td colspan="2">36</td><td colspan="2">12</td><td colspan="2">24</td><td colspan="2">36</td><td colspan="2">12</td><td colspan="2">24</td><td colspan="2">36</td></tr>
<tr><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td><td>Span[f]</td><td>NJ[d]</td></tr>
</table>

TABLE 2308.7.2(3) RAFTER SPANS FOR COMMON LUMBER SPECIES (Allowable stress design g~~G~~round snow load, $p_{g(asd)}$ = 30 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

TABLE 2308.7.2(4) RAFTER SPANS FOR COMMON LUMBER SPECIES (Allowable stress design g~~G~~round snow load, $p_{g(asd)}$ = 50 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

TABLE 2308.7.2(5) RAFTER SPANS FOR COMMON LUMBER SPECIES(Allowable stress design g~~G~~round snow load, $p_{g(asd)}$ = 30 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

TABLE 2308.7.2(6) RAFTER SPANS FOR COMMON LUMBER SPECIES (Allowable stress design g~~G~~round snow load, $p_{g(asd)}$ = 50 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

TABLE 2308.7.3.1 RAFTER TIE CONNECTIONS[i]

Portions of table not shown remain unchanged.

RAFTER SLOPE	TIE SPACING (inches)	LIVE LOAD ONLY[g]			ALLOWABLE STRESS DESIGN GROUND SNOW LOAD, $p_{g(asd)}$ (pounds per square foot)					
					30 pounds per square foot			50 pounds per square foot		
		Roof span (feet)								
		12	24	36	12	24	36	12	24	36
		Required number of 16d common ($3\frac{1}{2}$″ x 0.162″) nails per connection[a, b, c, d, e, f, h]								

Committee Reason: Approved as modified as the proposal updates consistent with ASCE 7-22 for allowable stress design. The modification updates provide clarity on the snow loads to be utilized. (Vote: 13-0)

Final Hearing Results

S210-22	AM

S211-22

Original Proposal

IBC: 2304.10.1

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Jason Smart, American Wood Council (jsmart@awc.org)

2021 International Building Code

Revise as follows:

2304.10.1 ~~Connection fire-resistance rating~~Fire protection of connections.
~~*Fire-resistance* ratings for connections in~~Connections used with fire-resistance-rated members and in fire-resistance-rated assemblies of Type IV-A, IV-B or IV-C construction shall beprotected for the time associated with the *fire-resistance rating*. Protection time shall be determined by one of the following:

1. Testing in accordance with Section 703.2 where the connection is part of the*fire-resistance* test.
2. Engineering analysis that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250°F (139°C), and a maximum temperature rise of 325°F (181°C), for a time corresponding to the required *fire-resistance* rating of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners and portions of wood members included in the structural design of the connection.

Reason: Revise title and description of section requirements to avoid using the term "fire-resistance rating" as it applies to connections. The provisions of Section 2304.10.1 are for determining fire protection of connections; there is no standardized test for establishing a fire-resistance rating of a connection in and of itself. This change clarifies the code intent that connections are required to be protected for the time associated with the fire-resistance rating, as required by Sections 704.2 and 704.3.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies the requirements for fire protection of connections.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as it clarifies the requirements for fire protection of connections. (Vote: 13-0)

Final Hearing Results

S211-22	AS

S213-22

Original Proposal

IBC: TABLE 2304.10.2

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council, American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.10.2 FASTENING SCHEDULE

Portions of table not shown remain unchanged.

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION	
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	Intermediate supports (inches)
30. $^{3}/_{8}$″ - $^{1}/_{2}$″	6d common or deformed (2″ × 0.113″); or 2$^{3}/_{8}$″ × 0.113″ nail (subfloor and wall)	6	12
	8d common or deformed (2$^{1}/_{2}$″ × 0.131″× 0.281″ head) nail (roof); or RSRS-01 (2$^{3}/_{8}$″ × 0.113″ × 0.281″ head) nail (roof)[d]	6[e]	6[e]
	1$^{3}/_{4}$″ 16 gage staple, $^{7}/_{16}$″ crown (subfloor and wall)	4	8
	2$^{3}/_{8}$″ × 0.113″× 0.266″ head nail (roof)	3[f]	3[f]
	1$^{3}/_{4}$″ 16 gage staple, $^{7}/_{16}$″ crown (roof)	3[f]	3[f]
31. $^{19}/_{32}$″ - $^{3}/_{4}$″	8d common (2$^{1}/_{2}$″ × 0.131″); or deformed (2″ × 0.113″) (subfloor and wall)	6	12
	8d common or deformed (2$^{1}/_{2}$″ × 0.131″ × 0.281″ head) nail (roof); or RSRS-01 (2$^{3}/_{8}$″ × 0.113″ × 0.281″ head) nail (roof)[d]	6[e]	6[e]
	2$^{3}/_{8}$″ × 0.113″× 0.266″ head nail; or 2″ 16 gage staple, $^{7}/_{16}$″ crown	4	8

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS~~-01~~ is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ultimate design wind speed is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS. Where the specific gravity of the wood species used for roof framing is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, fastening of roof sheathing shall be with RSRS-03 (2-1/2″× 0.131″× 0.281″head) nails unless alternative fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing is less than 0.35, fastening of the roof sheathing shall be designed in accordance with AWC NDS.

f. Fastening is only permitted where the ultimate design wind speed is less than or equal to 110 mph<u>and where fastening is to wood framing of a species with specific gravity greater than or equal to 0.42 in accordance with AWC NDS</u>.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

Reason: Fastening of roof sheathing to resist wind uplift forces per ASCE 7-16 and to agree with 2018 Wood Frame Construction Manual tables is based on wood framing of species with specific gravity equal to 0.42 (per proposal S173-19). For applications using species with lower specific gravity as wood roof framing (i.e., specific gravity less than 0.42 but equal to or greater than 0.35), the footnote is expanded to require use of the RSRS-03 nail unless alternative fastening is designed. The use of RSRS-03 nail (a standard ring shank nail) will maintain the same fastener spacing recommendations within the scope of applicability which is up to 140 mph wind speed. Engineered design of the fastening is required when specific gravity of the wood species used for roof framing is less than 0.35. Footnote f is revised to recognize the 0.42 specific gravity limit in addition to the existing wind speed limit of 110 mph for the prescribed nail and staple where used for roof sheathing fastening.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, the added ring shank nail option for resisting ASCE 7 wind uplift forces will provide equivalent withdrawal performance to the 0.42 specific gravity and smooth nail basis of the existing fastening schedule without requiring engineered design.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as per the provided reason statement. (Vote: 13-0)

Final Hearing Results

S213-22 AS

S214-22

Original Proposal

IBC: TABLE 2304.10.2

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council, American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2304.10.2 FASTENING SCHEDULE

Portions of table not shown remain unchanged.

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION	
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	Intermediate supports (inches)
31. $^{19}/_{32}$″ - $^{3}/_{4}$″	8d common (2$^{1}/_{2}$″ × 0.131″); or deformed (2″ × 0.113″) (subfloor and wall)	6	12
	8d common or deformed (2$^{1}/_{2}$″ × 0.131″ × 0.281″ head) (roof) or RSRS-01 (2$^{3}/_{8}$″ × 0.113″) nail (roof)[d]	6[e]	6[e]
	2$^{3}/_{8}$″ × 0.113″× 0.266″ head nail; or 2″ 16 gage staple, $^{7}/_{16}$″ crown (subfloor and wall)	4	8

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ultimate design wind speed is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS.

f. Fastening is only permitted where the ultimate design wind speed is less than or equal to 110 mph.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

Reason: Clarify applicability of 0.113" nail and staple fastener type to subfloor and wall applications consistent with similar usage of 0.113" nail and staples for thinner sheathing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification of existing requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies the requirements for subfloor and wall fastening. (Vote: 13-0)

Final Hearing Results

S214-22	AS

S215-22

Original Proposal

IBC: 2304.10.6, ASTM Chapter 35 (New)

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Building Code

Revise as follows:

2304.10.6 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with *preservative-treated* and *fire-retardant-treated wood* shall be in accordance with Sections 2304.10.6.1 through 2304.10.6.4. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153 Class D or ASTM A641 Class 3S [1 oz/ft^2 (305 g/m^2)]. Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M-19 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: Rationale: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft^2. Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft^2.

Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
proposal will not add or reduce cost. proposal aligns with current industry practices

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2304.10.6 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with *preservative-treated* and *fire-retardant-treated wood* shall be in accordance with Sections 2304.10.6.1 through 2304.10.6.4. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153. The coating weight for zinc-coated nails shall be in accordance with ASTM A153, Class D or ASTM A641 Class 3S [1 oz/ft^2 (305 g/m^2)]. Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

Committee Reason: Approved as modified as the proposal updates to the appropriate standard, ASTM A641-19. The modification clarifies the standard for coating weight for zinc-coated nails. (Vote: 13-0)

Final Hearing Results

S215-22 AM

S217-21

Original Proposal

IBC: 2304.11.1.1

Proponents: Jonathan Siu, Self, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, City of Seattle, Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

2304.11.1.1 Columns. Minimum dimensions of columns shall be in accordance with Table 2304.11. Columns shall be ~~continuous or superimposed throughout all stories and~~ connected in an *approved* manner. <u>Columns shall be continuous or superimposed throughout all stories of Type IV-HT construction.</u> Girders and beams at column connections shall be closely fitted around columns and adjoining ends shall be cross tied to each other, or intertied by caps or ties, to transfer horizontal *loads* across joints. Wood bolsters shall not be placed on tops of columns unless the columns support roof *loads* only. Where traditional heavy timber detailing is used, connections shall be by means of reinforced concrete or metal caps with brackets, by properly designed steel or iron caps, with pintles and base plates, by timber splice plates affixed to the columns by metal connectors housed within the contact faces, or by other *approved* methods.

Reason: 2021 IBC Section 2304.11.1.1 requires continuous column lines for all heavy timber construction types (IV-A, IV-B, IV-C, IV-HT). That is, columns must line up vertically, from foundation to roof—no transfers of column loads via slabs or beams to other columns are permitted. This puts unnecessary restrictions on the structural design of all mass timber buildings. This historical limitation on column load transfers intended for “traditional” heavy timber construction is not justified for the new Types IV-A, IV-B, or IV-C construction, nor should load transfer be restricted for podium construction in Section 510.
This proposal solves the problem by allowing column load transfers to occur in Types IV-A/B/C construction and in podium construction by specifying the restriction on column load transfers only applies to Type IV-HT construction (“traditional” heavy timber).

I believe this is an issue the ICC Ad-Hoc Committee on Tall Wood Buildings (TWB) overlooked in their deliberations when they wrote the new provisions for mass timber in the 2021 IBC. While the TWB discussed many fire/life safety and structural issues, they did not delve deeply into the structural detailing provisions existing in the code, so this issue was not identified.

Background:

IBC Section 2304.11 governs the sizes and some of the structural detailing requirements for heavy timber. All mass timber is required to comply with this section (see the definition for Mass Timber, and Section 602.4). Section 2304.11.1.1 deals with the detailing for columns. As written in the current code, the second sentence essentially requires heavy timber column lines to be continuous vertically, from foundation to roof:

- “Columns shall be <u>continuous or superimposed throughout all stories</u> and connected in an *approved* manner [emphasis mine].”

“Continuous or superimposed” means column loads cannot be transferred horizontally via beams of any material (fire-resistance rated or not) to other columns, or by a concrete transfer slab to columns or walls. In podium construction (Section 510.2), the continuity requirement plus a literal reading of “throughout all stories” dictates steel or concrete columns are required to be placed in the Type IA podium under every heavy timber column, and continue through the podium to the foundation.

The column continuity requirement has been in the codes for many decades, including the 1956 edition of the Seattle Building Code, which I presume was based on a legacy code. I did not research further back than that.

Discussion:

From a purely structural engineering standpoint, there is no reason for this restriction. Any transfer beam or slab would have to be designed for the loads in accordance with the structural provisions in the code. Transfer beams, girders, and slabs are common in all types of construction.

From a fire protection standpoint, an argument can be made for requiring column continuity for “traditional” heavy timber construction (Type

IV- HT), where there is no requirement for fire-resistance ratings for connections. For example, if a transfer beam were supporting a column supporting multiple stories, the failure of a single unprotected transfer beam connection could trigger a multi-story collapse. While this proposal is not eliminating the requirement, it is noteworthy that no other type of construction has this requirement for column continuity. For example, steel transfer beams supporting columns are allowed in all types of construction, as long as the beams and connections are provided with the required fire-resistance rating. Unprotected steel transfer beams and connections are allowed in Types IIB, IIIB, and VB construction.

In Types IV-A, -B, and -C construction, the connections<u>are</u> required to have a fire-resistance rating (see AWC/NDS Section 16.1). For mass timber, wood char is allowed to account for some of the protection in Types IV-A and -B construction, and all of the protection in Type IV-C. Since the connections have a fire-resistance rating, there is not the same potential for failure described above for Type IV-HT. It does not make sense from a fire protection standpoint that loads cannot be transferred horizontally where there is rated construction. Steel and concrete beams are allowed to support columns, provided the beams, including their connections, are appropriately protected. There is no reason to treat fire-resistance-rated mass timber differently.

Some states, including the State of Washington, have adopted these provisions into their current codes. As these new types of construction are being explored by design professionals, they are posing questions to local building officials or requesting interpretations for issues that do not appear to have been covered in TWB discussions. This code change proposal is intended to address one of those questions by clarifying the application of the code through limiting the historical requirement for column continuity to “traditional” Type IV-HT construction, where it was originally intended to apply.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this is a clarification in the application of the code provisions, there is no increase or decrease in the cost of the construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2304.11.1.1 Columns. Minimum dimensions of columns shall be in accordance with Table 2304.11. Columns shall be connected in an *approved* manner. Columns shall be continuous or<u>aligned vertically from floor to floor in</u> ~~superimposed throughout~~ all stories of Type IV-HT construction. Girders and beams at column connections shall be closely fitted around columns and adjoining ends shall be cross tied to each other, or intertied by caps or ties, to transfer horizontal *loads* across joints. Wood bolsters shall not be placed on tops of columns unless the columns support roof *loads* only. Where traditional heavy timber detailing is used, connections shall be by means of reinforced concrete or metal caps with brackets, by properly designed steel or iron caps, with pintles and base plates, by timber splice plates affixed to the columns by metal connectors housed within the contact faces, or by other *approved* methods.

Committee Reason: Approved as modified per the provided reason statement. The modification cleans up the confusing language in section 2304.11.1.1. (Vote: 13-0)

Final Hearing Results

S217-21	AM

S218-22

Original Proposal

IBC: 2305.1, 2305.1.2 (New)

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2305.1 General. Structures using wood~~-frame~~ *shear walls* or wood~~-frame~~ *diaphragms* to resist wind,<u>and</u> seismic ~~or other lateral~~ *loads* shall be designed and constructed in accordance with AWC SDPWS and the applicable provisions of Sections 2305, 2306 and 2307.

Add new text as follows:

<u>**2305.1.2 Permanent load duration.** Permanent loads are associated with permanent load duration as defined by the ANSI/AWC NDS. For wood shear walls and wood diaphragms designed to resist loads of permanent load duration, the design unit shear capacities shall be taken as the AWC SDPWS nominal unit shear capacities, multiplied by 0.2 for use with *Allowable Stress Design* in Section 2306 and 0.3 for use with *Load and Resistance Factor Design* in Section 2307</u>.

Reason: Proposal revises Section 2305.1 to use “wood shear walls” and “wood diaphragms” instead of “wood-frame” shear walls and diaphragms to account for both wood-frame and cross-laminated timber shear walls and diaphragms in AWC SDPWS. Reference to the SDPWS is appropriate for design of wood shear walls and diaphragms to resist wind and seismic, but for resistance to permanent lateral loads, such as soil loads in foundation design, the nominal unit shear capacities in SDPWS need further reduction to account for long-term effects. Permanent loads are associated with permanent load duration as defined by ANSI/AWC NDS.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies applicability of SDPWS reference for wood shear walls and wood diaphragms and provides requirements for use of SDPWS values for permanent load applications.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2305.1 General. Structures using wood *shear walls* or wood *diaphragms* to resist wind~~,~~ <u>or</u> ~~and~~ seismic *loads* shall be designed and constructed in accordance with AWC SDPWS and the applicable provisions of Sections 2305, 2306 and 2307.

2305.1.2 Permanent load duration. Permanent loads are associated with permanent load duration~~as defined by~~ <u>in accordance with</u> the ANSI/AWC NDS. For wood shear walls and wood diaphragms designed to resist <u>lateral</u> loads of permanent load duration <u>only and that are not in combination with wind or seismic lateral loads</u>, the design unit shear capacities shall be taken as the AWC SDPWS nominal unit shear capacities, multiplied by 0.2 for use with *Allowable Stress Design* in Section 2306 and 0.3 for use with *Load and Resistance Factor Design* in Section 2307.

Committee Reason: Approved as modified as the proposal provides clarification for the permanent load duration condition. The modification improves and clarifies the language of the proposal(Vote: 13-0)

Final Hearing Results

S218-22 AM

S219-22

Original Proposal

IBC: TABLE 2308.6.3(1)

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council, American Wood Council (pline@awc.org)

2021 International Building Code

Revise as follows:

TABLE 2308.6.3(1) BRACING METHODS

Portions of table not shown remain unchanged.

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA[a]	
			Fasteners	Spacing
GB Gypsum board (Double sided)	$^{1}/_{2}$″ or $^{5}/_{8}$″ by not less than 4′ wide to studs at maximum of 24″ o.c.		Section 2506.2 for exterior and interior sheathing: 5dannual ringed cooler nails (1$^{5}/_{8}$″ × 0.086″) or 1$^{1}/_{4}$″ screws (Type W or S) for $^{1}/_{2}$″ gypsum board or 1$^{5}/_{8}$″ screws (Type W or S) for $^{5}/_{8}$″ gypsum board	For all braced wall panel locations: 7″ o.c. along panel edges (including top and bottom plates) and 7″ o.c. in the field

For SI: 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

a. Method LIB shall have gypsum board fastened to one or more side(s) with nails or screws

Reason: The term “annual ringed” is incorrect an may have been intended to describe “annular ringed”. However, “5d cooler nails” are commonly prescribed for gypsum board attachment and likely intended over "annular ringed" for consistency with nail descriptions in Table 2508.6 and Tables 721.1(1), 721.1(2), and 721.1(3). 5d cooler nails are also prescribed for gypsum board bracing at interior locations per Table R602.10.4 and R702.3.5.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a clarification that leads to consistent nail description for this application.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal deletes the incorrect the term 'annual ringed'. (Vote: 13-0)

Final Hearing Results

S219-22	AS

S220-22

Original Proposal

IBC: 2306.1.3, 2306.1.4 (New)

Proponents: Jason Smart, American Wood Council (jsmart@awc.org); David Tyree, American Wood Council, American Wood Council (dtyree@awc.org)

2021 International Building Code

Revise as follows:

2306.1.3 Preservative-treated wood allowable stresses ~~stress adjustments~~. The allowable unit stresses for *preservative-treated wood* conforming to AWPA U1 and M4need not be adjusted for treatment, but are subject to other adjustments.Load duration factors greater than 1.6 shall not be used in the structural design of *preservative-treated wood* members.
~~The allowable unit stresses for fire-retardant-treated wood, including fastener values, shall be developed from an approved method of investigation that considers the effects of anticipated temperature and humidity to which the fire-retardant-treated wood will be subjected, the type of treatment and the redrying process. Other adjustments are applicable except that the impact load duration shall not apply.~~

Add new text as follows:

2306.1.4 Fire-retardant-treated wood allowable stresses.. The allowable unit stresses for *fire-retardant-treated wood*, including connection design values, shall be developed in accordance with the provisions of Section 2303.2.5. Load duration factors greater than 1.6 shall not be used in the structural design of *fire-retardant-treated wood* members.

Reason: Provisions pertaining to fire-retardant-treated wood are broken into a separate section from those pertaining to preservative-treated wood, due to the fact that they are handled differently. Adjustments for treatment are not necessary for preservative treated wood conforming with AWPA U1 and M4, whereas adjustments are necessary for fire-retardant-treated wood. The scope of existing Section 2306.1.3 is narrowed to address only preservative-treated wood.
A new Section 2306.1.4, referencing the applicable provisions in Section 2305.2.5, is created to address fire-retardant-treated wood.

A new sentence is added to both sections stating that load duration factors, as used in the NDS, shall not exceed 1.6. This clarifies the current prohibition on use of the impact load duration factor and provides consistency with AWC NDS provisions for both preservative-treated wood and fire-retardant-treated wood.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides clarification of the requirements consistent with the intent of existing code provisions and referenced standards.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2306.1.3 Preservative-treated wood allowable stresses. The allowable unit stresses for *preservative-treated wood* conforming to AWPA U1 ~~and M4~~ need not be adjusted for treatment, but are subject to other adjustments. Load duration factors greater than 1.6 shall not be used in the structural design of *preservative-treated wood* members.

Committee Reason: Approved as modified as the proposal provides clarity by separating section 2306.1.3 into two separate sections. The modification deletes reference to M4 for field cuts which does not apply to this section. (Vote: 13-0)

Final Hearing Results

S220-22 AM

S222-22

Original Proposal

IBC: SECTION 202 (New), 2308.2.7 (New), 2308.2

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); J Daniel Dolan, Washington State University, Seismic Code Support Committee (jddolan@wsu.edu)

2021 International Building Code

Add new definition as follows:

[BS] CRIPPLE WALL CLEAR HEIGHT. The vertical height of a cripple wall from the top of the foundation to the underside of floor framing above.

Add new text as follows:

2308.2.7 Hillside light-frame construction. Design in accordance with Section 2308.1.1 shall be provided for the floor immediately above the *cripple walls* or post and beam systems and all structural elements and connections from this floor down to and including connections to the foundation and design of the foundation to transfer lateral loads from the framing above in buildings where all of the following apply:

1. The grade slope exceeds 1 unit vertical in 5 units horizontal where averaged across the full length of any side of the building, and
2. The tallest *cripple wall clear height* exceeds 7 feet (2134 mm), or where a post and beam system occurs at the building perimeter, the post and beam system tallest post clear height exceeds 7 feet (2134 m), and
3. Of the total plan area below the lowest framed floor, whether open or enclosed, less than 50 percent is*occupiable space* having interior wall finishes conforming to Section 2304.7 or Chapter 25 of this code.

Exception: Light-frame buildings in which the lowest framed floor is supported directly on concrete or masonry walls over the full length of all sides except the downhill side of the building are exempt from this provision.

Revise as follows:

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the limitations in Sections 2308.2.1 through ~~2308.2.6~~ 2308.2.7.

Reason: This proposal provides correlation between the prescriptive provisions of IBC Section 2308 and the provisions of IRC Section R301.2.2.6 Item 8, added in the 2021 IRC with the intent of improving the seismic performance of wood-light-frame hillside buildings. A related modification has been made in ASCE/SEI 7-22 to provide additional guidance to engineers designing wood light-frame hillside buildings.
As part of work contributing to *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard* (FEMA P-1100, 2018), it was identified that for light-frame buildings on steep hillsides (Figure 1), adequate seismic performance does not occur when seismic design is based on typical seismic force distribution assumptions (tributary area, flexible diaphragm). Whether loading is in the cross-slope or out-of-hill direction (Figure 2), seismic forces follow the stiffest load path to the uphill foundation, rather than distributing uniformly to all the bracing walls in the way assumed in development of IBC Section 2308 seismic bracing provisions. For this reason, design using the IBC Section 2308 bracing provisions will not provide adequate seismic performance. This change proposal triggers an engineered lateral force design for the lower portion of hillside buildings by adding the hillside building configuration to the already existing list of Section 2308.2 limitations.

This building configuration was illustrated to be vulnerable in the 1994 Northridge, California Earthquake. The Earthquake Spectra

Northridge Earthquake Reconnaissance Report (Volume 2, EERI, 1996) reported 117 significantly damaged hillside buildings of the bearing wall type and 40 of the post and beam (stilt) type. Fifteen dwellings were reported to have collapsed or were so near collapse that they were immediately demolished and another fifteen came close to collapsing. HUD (1994) also reported significant damage to hillside buildings. As examples of vulnerable hillside building performance, Figure 3 illustrates a building that pulled about six inches away from the uphill foundation, but did not collapse, and Figure 4 illustrates one of the buildings that collapsed in the 1994 earthquake.

Blaney et. Al. (2018) illustrates results from numerical studies used in development of FEMA P-1100. Figure 18 of this reference indicates that for a studied hillside building, the probability of collapse in the risk-adjusted maximum considered earthquake (MCE_R) was reduced by more than a factor of seven by changing from typical prescriptive bracing practice to an engineered methodology that considered the seismic response. More background on building past performance and the numerical studies are found in FEMA P-1100.

The Item 1 grade slope trigger is used to limit applicability of this provision to buildings that are on sites with a significant slope (Figure 5). Averaging the grade slope along the side of the building is intended to focus on the overall drop in grade elevation across the building and not trigger the irregularity based only on limited areas of higher grade slope. This is consistent with the numerical studies that form the basis of this proposal. For most buildings this criterion will be evaluated by looking at each of the four primary elevations. For large and more complex buildings, additional “sides” will need to be evaluated.

Item 2 adds a second trigger of downhill cripple wall height greater than 7’-0” (Figure 6) or downhill post clear height in post and pier building (Figure 7) based on the FEMA P-1100 numerical studies. The studies showed that for buildings with cripple walls greater than 7’-0” prescriptive design can lead to significantly diminished seismic performance. The reduction in performance was not as great with cripple walls of seven feet or less.

Item 3 adds a trigger where a significant portion of the underfloor area does not have interior finishes, as the strength and stiffness of seismic bracing are significantly diminished when interior finish materials are not present. Figure3 shows a dwelling where none of the underfloor area is enclosed. Figure 1 shows a dwelling where 100% of this underfloor area is enclosed. If this has interior finishes than Item 3 would not be applicable. If Figure 1 does not have interior finished then Item 3 would be applicable.

All three items must be applicable in order for dwelling to require engineered design. These triggers were observed to be the points at which damage and displacements at the uphill foundation were thought to significantly increase the likelihood of collapse.

The exception scopes out engineered design of hillside buildings that have full-height concrete or masonry walls (Figure 8) because this configuration was not part of the numerical studies that form the basis of this proposal. For a building with a simple rectangular floor plan, full height concrete or masonry walls would need to occur on three sides to qualify for the exception. For a more complex building plan configuration, additional concrete or masonry walls would be required to qualify for the exception. Buildings are permitted to have doors and windows in the concrete or masonry walls and still qualify for the exception. In all buildings the concrete or masonry walls will need to conform to applicable IBC provisions.

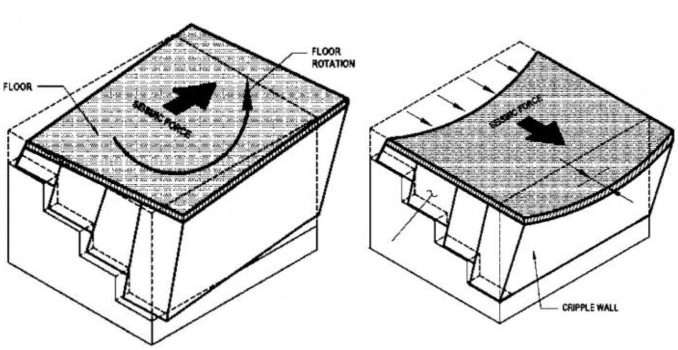

Figure 1 Hillside light-frame structure.   Figure 2. Hillside structure cross-slope and out-of-hill loading.

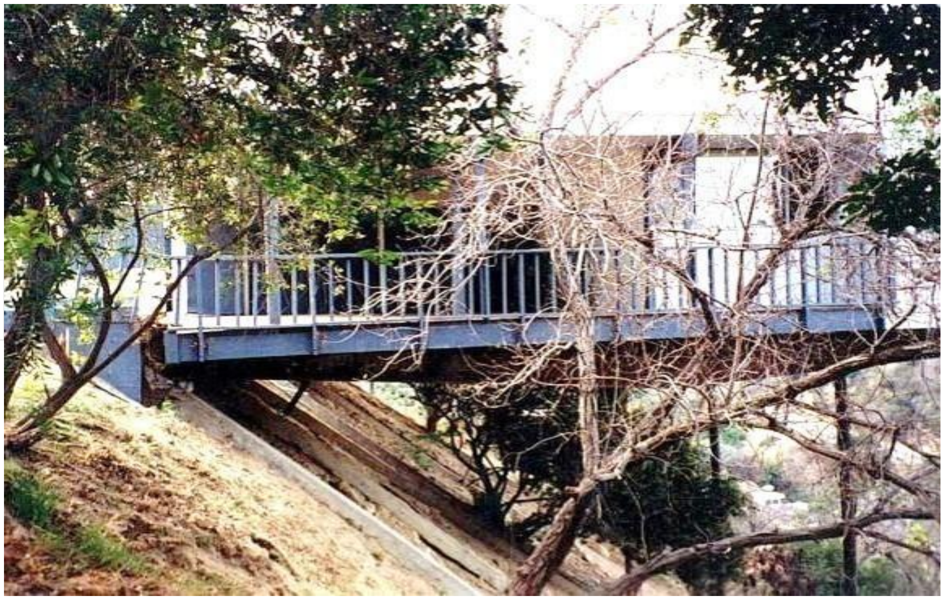

Figure 3. Hillside building pulled away from uphill foundation in the 1994 Northridge, California Earthquake (Credit: City of Los Angeles Department of Building and Safety). Red arrow shows location where floor framing has pulled six to eight inches away from the uphill foundation.

Figure 4. Hillside building collapse in the 1994 Northridge, California Earthquake (Credit: City of Los Angeles Department of Building and Safety).

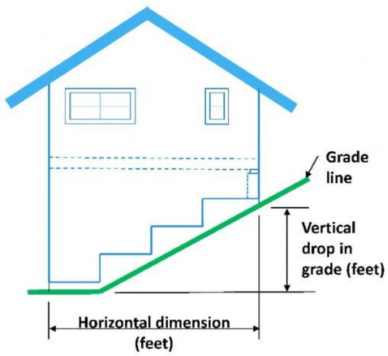

Figure 5. Grade slope triggering the hillside building engineered design exceeds 1 vertical in 5 horizontal across the full width of any side of the building.

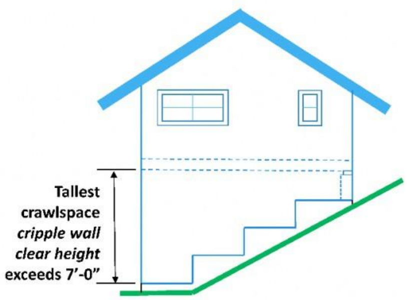

Figure 6. Downhill cripple wall height triggering the hillside building engineered design.

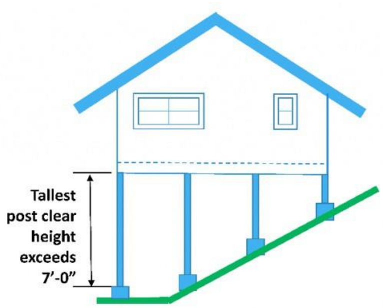

Figure 7. Downhill post height triggering the hillside building engineered design.

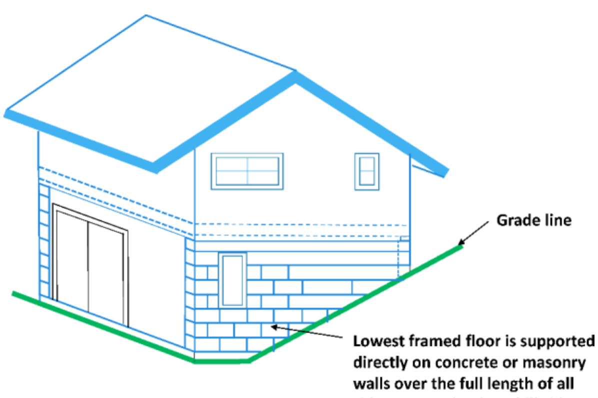

Figure 8. Concrete or masonry wall configuration that does not tripper the hillside building engineered design.

Cost Impact: The code change proposal will increase the cost of construction
This proposal is anticipated to increase the number of dwellings required to have an engineered lateral force design for moderately steep to very steep sites. In regions where these dwellings are believed to already be predominantly engineered, the cost impact is thought to be negligible. In other regions where these dwellings are not predominantly engineered, additional costs will be incurred for engineered design and more robust anchorage to the foundation.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately adds requirements for hillside light-frame construction and per the first paragraph of the provided reason statement. (Vote: 13-1)

Final Hearing Results

S222-22	AS

S223-22

Original Proposal

IBC: 2308.1, 2308.1.1, 2308.1.2, 2308.2, 2308.3 (New), 2308.4 (New), 2308.5 (New), 2308.8, 2308.8.1, 2308.8.2
Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

2308.1 General. The requirements of this section are intended for buildings of *conventional light-frame construction* not exceeding the height limitations of Section 2308.2.1. Other construction methods are permitted to be used, provided that a satisfactory design is submitted showing compliance with other provisions of this code. Interior nonload-bearing partitions, ceilings and curtain walls of *conventional light-frame construction* are not subject to the limitations of Section 2308.2. Detached one- and two-family dwellings and townhouses not more than three *stories above grade plane* in height with a separate *means of egress* and their accessory structures shall comply with the *International Residential Code* .

Delete without substitution:

~~**2308.1.1 Portions exceeding limitations of conventional light-frame construction.** Where portions of a building of otherwise *conventional light-frame construction* exceed the limits of Section 2308.2, those portions and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the nonconventional light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system.~~

~~**2308.1.2 Connections and fasteners.** Connectors and fasteners used in conventional construction shall comply with the requirements of Section 2304.10.~~

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the limitations in Sections 2308.2.1 through 2308.2.6.

Add new text as follows:

2308.3 Portions or elements exceeding limitations of conventional light frame construction. Where a building of otherwise *conventional light-frame construction* contains portions or structural elements that exceed the limits of Section 2308.2, those portions or elements, and the supporting load path, shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the nonconventional light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system.

2308.4 Structural elements or systems not described herein. Where a building of otherwise conventional construction contains structural elements or systems not described in Section 2308, these elements or systems shall be designed in accordance with accepted engineering practice and the provisions of this code. The extent of such design need only demonstrate compliance of the nonconventional elements with other applicable provisions of this code and shall be compatible with the performance of the conventionally framed system.

2308.5 Connections and fasteners. Connectors and fasteners used in conventional construction shall comply with the requirements of Section 2304.10.

Delete without substitution:

~~**2308.8 Design of elements.** Combining of engineered elements or systems and conventionally specified elements or systems shall be permitted subject to the limits of Sections 2308.8.1 and 2308.8.2.~~

~~**2308.8.1 Elements exceeding limitations of conventional construction.** Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section 2308.2, these elements and the supporting *load* path shall be designed in accordance with accepted engineering practice and the provisions of this code.~~

~~**2308.8.2 Structural elements or systems not described herein.** Where a building of otherwise conventional construction contains structural elements or systems not described in Section 2308, these elements or systems shall be designed in accordance with accepted engineering practice and the provisions of this code. The extent of such design need only demonstrate compliance of the nonconventional elements with other applicable provisions of this code and shall be compatible with the performance of the conventionally framed system.~~

Reason: The purpose of this code change is to emphasize the limitations on story height for conventional construction and to editorially rearrange related sections so they make more sense.
Section 2308 contains prescriptive construction requirements for small wood-frame construction that is outside the scope of the IRC. Just like in the IRC, in order to keep things simple there needs to be limits on things like environmental loads, live and dead loads, number of stories, and sizes of certain building elements. Section 2308.2 provides these limitations. However, the section before that, 2308.1.1, allows "portions" of buildings that exceed these limits to be built as long as the portion is designed. The BCAC believes the intent is to permit exceeding the limits in certain cases, but not to permit exceeding the story height limits of Section 2308.2.1. So the first change adds the limitation in the very first section that the story limitation of 2308.2.1 is the absolute minimum, just as the IRC does.

Looking at the organization of this section, 2308.1.1 describes what to do when "portions" exceed the limitations. Then 2308.2 describes all the limitations. Then much later in the section, 2308.8 describes what to do when "elements" exceed the limits for Conventional Construction.

It makes more sense to have the limitations at the beginning of the section, and then combine the sections on "portions" and "elements" that exceed the limitations right after that.

The section on "design of elements" seems unrelated enough that it should have its own section, also at the beginning of the Section. Finally, Section 2308.1.2 on Fasteners and Connectors seems like it should not be placed before the limitations of the entire section. It is proposed to move it after the sections on Limitations and design of portions and elements that exceed those limitations.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of current code requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2308.1 General. The requirements of this section are intended for buildings of*conventional light-frame construction* not exceeding the story height limitations of Section 2308.2.1. Other construction methods are permitted to be used, provided that a satisfactory design is submitted showing compliance with other provisions of this code. Interior nonload-bearing partitions, ceilings and curtain walls of *conventional light-frame construction* are not subject to the limitations of Section 2308.2. Detached one- and two-family dwellings and townhouses not more than three *stories above grade plane* in height with a separate *means of egress* and their accessory structures shall comply with the *International Residential Code* .

Committee Reason: Approved as modified as the proposal is editorial to improve and streamline the sections. The modification clarifies and coordinates the provisions. (Vote: 14-0)

Final Hearing Results

S223-22	AM

S224-22

Original Proposal

IBC: SECTION 2308.3 (New), 2308.3.1 (New), 2308.3.2 (New), 2308.3.2.1 (New), 2308.3.3 (New), 2308.3.4 (New), 2308.3.5 (New), 2308.4.2.4, 2308.5.9, 2308.5.10, 2308.7.4; IPC: 307.2, 307.3 (New), [BS] C101.1, [BS] C101.2, [BS] C101.3; IMC: [BS] 302.3, [BS] 302.3.1 , [BS] 302.3.2, [BS] 302.3.3; IFGC: [BS] 302.3, [BS] 302.3.2, [BS] 302.3.3, [BS] 302.3.4

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

SECTION 2308.3 CUTTING, NOTCHING AND BORING.

2308.3.1 Scope. The provisions of Section 2308.3 shall only apply to dimensional wood framing and shall not include engineered wood products, heavy timber, or pre-fabricated/manufactured wood assemblies.

2308.3.2 Floor joists, roof rafters, and ceiling joists. Notches on framing ends shall not exceed one-fourth the member depth. Notches in the top or bottom of the member shall not exceed one-sixth the depth and shall not be located in the middle third of the span. A notch not more than one-third of the depth is permitted in the top of a rafter or ceiling joist not further from the face of the support than the depth of the member. Holes bored in members shall not be within 2 inches (51 mm) of the top or bottom of the member and the diameter of any such hole shall not exceed one-third the depth of the member. Where the member is notched, the hole shall not be closer than 2 inches (51 mm) to the notch.

2308.3.2.1 Ceiling joists. Where ceiling joists also serve as floor joists, they shall be considered floor joists within this section.

2308.3.3 Wall studs. In *exterior walls* and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support *loads* other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.

2308.3.4 Bored holes. The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall not be closer than $^5/_8$ inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.

2308.3.5 Limitations. In designated lateral-force resisting system assemblies designed in accordance with this code and greater than three-stories in height or in Seismic Design Categories C, D, E, and F, the cutting, notching and boring of wall studs shall be as prescribed by the registered design professional.
In structures designed in accordance with the International Residential Code, modification of wall studs shall comply with the International Residential Code.

Delete without substitution:

~~**2308.4.2.4 Notches and holes.** Notches on the ends of joists shall not exceed one-fourth the joist depth. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist and the diameter of any such hole shall not exceed one-third the depth of the joist.~~

~~**2308.5.9 Cutting and notching.** In *exterior walls* and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support *loads* other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.~~

~~**2308.5.10 Bored holes.** The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall not be closer than $^5/_8$ inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.~~

~~**2308.7.4 Notches and holes.** Notching at the ends of rafters or ceiling joists shall not exceed one-fourth the depth. Notches in the top or bottom of the rafter or ceiling joist shall not exceed one-sixth the depth and shall not be located in the middle one-third of the span, except that a notch not more than one-third of the depth is permitted in the top of the rafter or ceiling joist not further from the face of the support than the depth of the member. Holes bored in rafters or ceiling joists shall not be within 2 inches (51 mm) of the top and bottom and their diameter shall not exceed one-third the depth of the member.~~

Reason: This proposal consolidates similar wood cutting, notching and boring criteria from the IFGC, IMC, IPC, and IBC into a single location in the IBC, and does not impose new requirements or restrict any practices currently allowed within the I-Codes. The proposed language draws from current language in the IPC, IMC, and IFGC and IBC provisions in the conventional light-framed section. The existing language was used to the greatest extent possible and relocated to minimize technical changes.
Within the IBC, existing wood framing notching, cutting and boring provisions have been relocated into a single new Section 2308.3. This reorganization into one location makes the IBC provisions easy to find and will provide clear and consistent criteria across all trades on how to field modify framing members and when modification of such members requires input from a design professional.

Structural framing members are frequently modified in the field by non-structural trades, to facilitate the installation of mechanical, electrical, plumbing, and other utilities. Especially in conventional light-framed wood construction, such modifications are rarely overseen by a design professional with knowledge of critical framing elements that should remain unmodified and the role they play within the structure.

It is unrealistic to expect field personnel to continually seek the guidance of a design professional for every framing member requiring modification. However, modifications of critical framing members have the potential to negatively impact the integrity of the structure and the utility systems that rely on that structure for support. The resulting structural deficiencies caused by field modifications to framing members may only be realized during significant high-wind, seismic, impact, or other loading events that, while within the normal structure design criteria, are outside every day operating conditions. At best, such deficiencies may be realized by local deformation of finish materials and at worst, by partial or full collapse of a structure.

Currently, the IFGC, IMC, IPC, and IBC all provide guidance on modification of structural framing elements within the path of utilities. Although the guidance provided by each code is similar, they are not identical in wording or scope and are handled differently within each document.

Differences include but are not limited to:

- IFGC, IMC: The cutting and notching criteria is within the main body of the code.
- IFGC, IMC: Includes direction for wood, steel, cold-formed steel, and non-structural cold-formed steel materials.
- IPC: Points to the IBC for cutting and notching criteria but provides Appendix C as an alternate. ·   IPC Appendix C
  - Includes some, but not all, cutting and notching criteria and limitations found within the IFGC and IMC.
  - Does not address steel and cold-formed materials.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal consolidates existing and slightly varied provisions from multiple locations into one location within the wood chapter of the International Building Code.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as the proposal needs additional work as it affects multiple codes which address different multiple trades and it is appropriate to leave the requirements in each code as is currently done. (Vote: 11-3)

Final Hearing Results

S224-22	AS

S227-22

Original Proposal

IBC: 2308.7.5, TABLE 2308.7.5

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Building Code

Revise as follows:

2308.7.5 Wind uplift. The roof construction shall have rafter and truss ties to the wall below. Resultant uplift *loads* shall be transferred to the foundation using a continuous *load* path. The rafter or truss to wall connection shall comply with Tables 2304.10.2 and 2308.7.5.

Exception: The truss to wall connection shall be permitted to be determined from the uplift forces as specified on the truss design drawings or as shown on the *construction documents*.

TABLE 2308.7.5 REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

~~NOMINAL~~ BASIC DESIGN WIND SPEED, V_{asd} [i]	ROOF SPAN (feet) 12	20	24	28	32	36	40	~~OVERHANGS (pounds/feet)[d]~~
EXPOSURE B								
~~85~~ 90	-~~72~~64	-~~120~~85	-~~145~~96	-~~169~~107	-~~193~~117	-~~217~~128	-~~241~~139	~~-38.55~~
~~90~~ 100	-~~91~~102	-~~151~~139	-~~181~~158	-~~212~~177	-~~242~~195	-~~272~~214	-~~302~~233	~~-43.22~~
~~100~~ 110	-~~131~~144	~~-281~~199	~~-262~~226	~~-305~~254	~~-349~~282	~~-393~~310	~~-436~~338	~~-53.36~~
~~110~~ 120	-~~175~~190	~~-292~~265	~~-351~~302	-~~409~~339	~~-467~~377	~~-526~~414	~~-584~~452	~~-64.56~~
130	-240	-335	-382	-431	-479	-528	-576	
140	-294	-411	-470	-530	-590	-650	-710	
EXPOSURE C								
90	-126	-175	-199	-223	-247	-272	-296	
100	-179	-250	-285	-320	-356	-391	-426	
110	-238	-332	-380	-428	-476	-525	-573	
120	-302	-424	-485	-547	-608	-669	-731	
130	-371	-521	-597	-674	-751	-828	-904	
140	-446	-628	-719	-812	-904	-997	-1090	
EXPOSURE D								
90	-166	-232	-265	-298	-311	-364	-396	
100	-229	-321	-367	-413	-459	-505	-551	
110	-298	-418	-478	-539	-601	-662	-723	
120	-373	-526	-603	-679	-756	-833	-910	
130	-455	-641	-734	-829	-924	-1020	-1114	
140	-544	-767	-878	-992	-1106	-1220	-1333	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 33 ~~30~~-foot mean roof height ~~located in Exposure B. For Exposure C or D and for other mean roof heights, multiply the loads by the following adjustment coefficients:~~.

	~~Mean Roof Height (feet)~~									
~~EXPOSURE~~	~~15~~	~~20~~	~~25~~	~~30~~	~~35~~	~~40~~	~~45~~	~~50~~	~~55~~	~~60~~
~~B~~	~~1.00~~	~~1.00~~	~~1.00~~	~~1.00~~	~~1.05~~	~~1.09~~	~~1.12~~	~~1.16~~	~~1.19~~	~~1.22~~
~~C~~	~~1.21~~	~~1.29~~	~~1.35~~	~~1.40~~	~~1.45~~	~~1.49~~	~~1.53~~	~~1.56~~	~~1.59~~	~~1.62~~
~~D~~	~~1.47~~	~~1.55~~	~~1.61~~	~~1.66~~	~~1.70~~	~~1.74~~	~~1.78~~	~~1.81~~	~~1.84~~	~~1.87~~

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements ~~do not account for~~ include the effects of 24" overhangs. ~~The magnitude of the loads shall be increased by adding the overhang loads found in the table. The overhang loads are based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.~~

e. The uplift connection requirements are based on wind loading on end zones as defined in Figure 28.3-1 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.75 ~~and multiplying the overhang load by 0.8~~.

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).

g. Interpolation is permitted for intermediate values of $V_{\cancel{asd}}$ and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.

i. $V_{\cancel{asd}}$ shall be determined in accordance with Section 1609.3~~.1~~.

Reason: The reason for this code change is to update the roof to wall connection loads to comply with the IBC referenced wind design standard, ASCE 7-16. The current loads are based on a very old version of ASCE 7. That can be seen by the use of the term V-asd. ASD wind loads have not been used since ASCE 7-10. The wind uplift loads need to be updated to the Ultimate Wind Speeds (now just called Basic Design Wind Speeds) used in ASCE 7-16 (and ASCE 7-22). That way the windspeeds will match the required Basic Design Windspeeds of Figures 1609.3(1) through 1609.3(12).
By adding a Basic Wind Speed down to 90 mph, there will be entries for the new lower Basic Wind Speed maps. Without these entries, users in those areas would have to use the entry for 85 mph V-asd, which converts to nearly 110 mph, meaning they would be overdesigning.

The new exception is added to allow the truss to wall connection to be designed using either the loads on the truss design drawings or the construction documents. That language is meant to be similar to Section R802.11.1, Truss uplift resistance, in the IRC.

This code change will not be affected if ASCE 7-22 is adopted as a referenced standard in the 2024 IBC.

Bibliography: American Wood Council
ANSI/AWC WFCM–2018: Wood Frame Construction Manual for One- and Two-Family Dwellings

ASCE/SEI American Society of Civil Engineers

ASCE 7–16 with Supplement 1: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Cost Impact: The code change proposal will increase the cost of construction
Depending on the Basic Wind Speed, this code change can either increase or decrease the cost of construction.

In areas with higher Basic Wind Speed, there may be an increase in costs, as the listed wind loads were previously incorrect.

Comparing 110 mph Basic Windspeed to 90 mph ASD, the uplift loads are around 15% greater for common roof spans. That small of a difference frequently will not make a difference in the choice of connector for roof to wall connection.

However, for lower Basic Wind Speed areas, there will be a cost savings. The new table has the benefit of being able to use this table for lower windspeeds as shown in the new Basic Wind Speed Maps, which would not have been possible without these changes. Using the lowest listed V-asd, 85 mph, and then converting to Basic Wind Speeds using Section 1609.3.1, only Basic windspeeds above 110 could be used, because when converted that results in 85 mph V-asd. With the new tables Basic Wind Speeds between less than 110 down to 90 mph will have table entries, so they will have lower costs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 2308.7.5 REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

BASIC ~~DESIGN~~ WIND SPEED, *V* [i]	ROOF SPAN (feet)						
	12	20	24	28	32	36	40
EXPOSURE B							
90	-64	-85	-96	-107	-117	-128	-139
100	-102	-139	-158	-177	-195	-214	-233
110	-144	-199	-226	-254	-282	-310	-338
120	-190	-265	-302	-339	-377	-414	-452
130	-240	-335	-382	-431	-479	-528	-576
140	-294	-411	-470	-530	-590	-650	-710
EXPOSURE C							
90	-126	-175	-199	-223	-247	-272	-296
100	-179	-250	-285	-320	-356	-391	-426
110	-238	-332	-380	-428	-476	-525	-573
120	-302	-424	-485	-547	-608	-669	-731
130	-371	-521	-597	-674	-751	-828	-904
140	-446	-628	-719	-812	-904	-997	-1090
EXPOSURE D							
90	-166	-232	-265	-298	-311	-364	-396
100	-229	-321	-367	-413	-459	-505	-551
110	-298	-418	-478	-539	-601	-662	-723
120	-373	-526	-603	-679	-756	-833	-910
130	-455	-641	-734	-829	-924	-1020	-1114
140	-544	-767	-878	-992	-1106	-1220	-1333

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 33 -foot mean roof height.

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements include the effects of 24" overhangs.

e. The uplift connection requirements are based on wind loading on end zones as defined in Figure 28.3-1 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.75 .

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).

g. Interpolation is permitted for intermediate values of *V* and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications. <u>The required rating of approved uplift connectors is based on Allowable Stress Design loads</u>.

i. *V* shall be determined in accordance with Section 1609.3.

Committee Reason: Approved as modified to coordinate the roof uplift with ASCE 7. The modification clarifies the requirements for Allowable Stress Design and updates the terminology to ASCE 7. (Vote: 14-0)

Final Hearing Results

S227-22	AM

S228-22

Original Proposal

IBC: 2405.2, 2405.3, 2405.3.1 (New), 2405.3.2 (New), 2405.3.3 (New), 2405.3.4 (New)

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2021 International Building Code

Revise as follows:

2405.2 Allowable glazing materials and limitations. Sloped glazing shall be any of the following materials, subject to the listed limitations.

1. For monolithic glazing systems, the glazing material of the single light or layer shall be laminated glass with a minimum 30-mil (0.76 mm) polyvinyl butyral (or equivalent) interlayer, wired glass, light-transmitting plastic materials meeting the requirements of Section ~~2607~~2606, heat-strengthened glass or fully tempered glass.
2. For multiple-layer glazing systems, each light or layer shall consist of any of the glazing materials specified in Item 1.

Annealed glass is permitted to be used as specified in Exceptions 2 and 3 of Section 2405.3.
Laminated glass and plastic materials described in Items 1 and 2 shall not require the screening or height restrictions provided in Section 2405.3.

For additional requirements for plastic skylights, see Section 2610. Glass-block construction shall conform to the requirements of Section 2110.1.

2405.3 Screening. ~~Where used in monolithic glazing systems, annealed, heat-strengthened, fully tempered and wired glass shall have b~~B roken glass retention screens, where required, ~~installed below the glazing material. The screens and their fastenings~~shall be: capable of supporting twice the weight of the glazing; firmly and substantially fastened to the framing members; and installed within 4 inches (102 mm) of the glass. The screens shall be constructed of a noncombustible material not thinner than No. 12 B&S gage (0.0808 inch) with mesh not larger than 1 inch by 1 inch (25 mm by 25 mm). In a corrosive atmosphere, structurally equivalent noncorrosive screen materials shall be used. ~~Annealed, heat-strengthened, fully tempered and wired glass, where used in multiple-layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening that conforms to the requirements for monolithic glazing systems.~~

~~**Exception:** In monolithic and multiple-layer sloped glazing systems, the following applies~~:

1. ~~Fully tempered glass installed without protective screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, shall have the highest point of the glass 10 feet (3048 mm) or less above the walking surface~~.
2. ~~Screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.~~
3. ~~Any glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade~~.
4. ~~Screens shall not be required in individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and the following conditions are met:~~
   4.1. ~~Each pane of the glass is 16 square feet (1.5 m^2) or less in area~~.

   4.2. ~~The highest point of the glass is 12 feet (3658 mm) or less above any walking surface or other accessible area~~.

   4.3. ~~The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.~~

5. ~~Screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 within the following limits:~~
   5.1. ~~Each pane of glass is 16 square feet (1.5 m^2) or less in area~~.

   5.2. ~~The highest point of the glass is 12 feet (3658 mm) or less above a walking surface or other accessible area~~.

Add new text as follows:

2405.3.1 Screens under monolithic glazing. Heat-strengthened glass and fully tempered glass shall have screens installed below the full area of the glazing material.

2405.3.2 Screens under multiple-layer glazing. Heat-strengthened glass, fully tempered glass and wired glass used as the bottom glass layer shall have screens installed below the full area of the glazing material.

2405.3.3 Screening in monolithic and multiple-layer sloped glazing systems. In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass shall be permitted to be installed without retention screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and having the highest point of the glass 10 feet (3048 mm) or less above the walking surface.
2. Retention screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, is permitted to be installed without retention screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Retention screens shall not be required in individual*dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:
   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.

   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface or other accessible area.

   4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.

5. Retention screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:
   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.

   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface or other accessible area.

2405.3.4 Screens not required. For all other types of glazing complying with Section 2405.2, retention screens shall not be required.

Reason: In section 2405.2, this proposal is correcting an inaccurate reference. The current reference to Section 2607 should be replaced with a reference to Section 2606. Section 2606 is where the general requirements and properties for light transmitting plastic are located, which is what item 1 of Section 2405.2 is speaking about. Section 2607, addressing light-transmitting plastic wall panels, is not germane to skylights and sloped glazing, as there are no performance requirements for plastic glazing materials listed in 2607. The performance requirements are in Section 2606.

In section 2405.3, this proposal is simply trying to make the language clearer on when screens are and are not required. There are no changes being made to what is or is not currently required when it comes to screening. The proposal is laying out the section with new subsections, in an attempt to make it easier for both the code user and enforcement, and eliminate interpretation issues that have occurred in the field.

In this proposed re-ordering of section 2405.3, it tells code users first what the screening requirements are, when used. Then in the following subsections, the proposal clearly lays out how screens must be installed for monolithic glazing and multiple layer glazing, followed by a subsection on the exceptions from screening for those types of sloped glazing systems when they meet certain criteria, and ending with a subsection for what types of glazing do not require screening.

Finally, this proposal provides a bit of clean-up and consistency of wording by ensuring in all places the term "retention screen" is used and making changes such as having "conditions are met" in both places instead of different wording.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will have no effect on the cost of construction as the changes presented are not meant to alter the current requirements but simply meant to provide better clarity and more consistency.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2405.3.3 Screening <u>not required</u> in monolithic and multiple-layer sloped glazing systems. In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass shall be permitted to be installed without retention screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and having the highest point of the glass 10 feet (3048 mm) or less above the walking surface.
2. Retention screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, is permitted to be installed without retention screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Retention screens shall not be required in individual*dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:
   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface or other accessible area.
   4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.
5. Retention screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:
   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface or other accessible area.

Committee Reason: Approved as modified as the proposal has no technical changes and the proposal cleans up the language for clarity. The committee noted that it is possible that the proposal 'lost' the requirements for annealed, heat strengthened glass. The modification updates the title of section 2405.3.3 to coordinate with the provisions. (Vote: 10-4)

Final Hearing Results

S229-22

Original Proposal

IBC: 2406.1

Proponents: Thom Zaremba, Roetzel & Andress, National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, Roetzel & Andress, Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

2021 International Building Code

Revise as follows:

2406.1 Human impact loads. All glass panes in ~~Individual~~ glazed areas, including glass mirrors,single panes of glass and all panes in multi-pane glass assemblies in hazardous locations as defined in Section 2406.4 shall comply with Sections 2406.1.1 through 2406.1.4.

Exception: Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.

Reason: In recent months, the glass industry has received reports of multi-pane glass assemblies imported from outside the United States where the outermost panes are marked as safety glazing, but center pane(s) in these multi-pane assemblies, are annealed glass which breaks dangerously when broken by human impact. Nothing in either safety glazing standard - namely CPSC 16 CFR 1201 and ANSI Z97.1 - prohibits this since they establish acceptance criteria ONLY for individual glass panes, not for multi-panel glass assemblies. Accordingly, the adoption of this proposal is critical to ensure that multi-pane glass assemblies installed in hazardous locations are safe in the event of human impact and to ensure that potentially dangerous annealed panes of glass are not intermingled with safety glazing in multi-pane glass assemblies.

Cost Impact: The code change proposal will increase the cost of construction
For anyone incorporating non-safety annealed glass panes into multi-pane glass assemblies believing that such assemblies can properly be installed in hazardous locations, this proposal will increase the cost of construction. However, it is believed that most multi-pane glass assemblies manufactured in the United States do not follow the practice of incorporating non-safety annealed glass into multi-pane glass assemblies. Consequently, if this proposal is adopted, there should be very little, if any, actual increase in the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2406.1 Human impact loads. All glass ~~panes~~ in glazed areas, including glass mirrors, single panes of glass, laminated glass and all panes in multi-pane glass assemblies in hazardous locations as defined in Section 2406.4 shall comply with Sections 2406.1.1 through 2406.1.4.

Exception: Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.

Committee Reason: Approved as modified as the proposal appropriately provides requirements for human impact loads for glass in hazardous locations. The modification provides needed clarification. (Vote: 14-0)

Final Hearing Results

S229-22 AM

S231-22

Original Proposal

IBC: 2406.4.3

Proponents: Gwenyth R. Searer, Wiss, Janney, Elstner Associates, Inc., myself (gsearer@wje.com)

2021 International Building Code

Revise as follows:

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor, roof, or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor, roof, or adjacent walking surface.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. Decorative glazing.
2. Where a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.
3. For insulating glass units or windows with multiple layers of glazing, these requirements pertain only to the layer(s) on the accessible side(s) of the windows. ~~Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is~~ ~~18 inches (457 mm) or more above any adjacent exterior surface.~~ ~~above 25 feet (7620 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.79 rad) surface adjacent to the glass exterior.~~

Reason: According to the Commentary for IBC Section 2406.4.3, the purpose of safety glazing is to "provide protection where the glazed opening could be mistaken for a passageway or clear opening that someone might be able to walk through, fall into, or otherwise be accidentally forced into." For areas that meet all four criteria listed in Section 2406.4.3, safety glazing is required. The criteria are used to determine whether or not someone could be near the glass, fall into the glass, break the glass, and then fall through the glass. The provision also provides three exceptions, but the third exception is complicated, and its intent is not particularly clear.
Rightly or wrongly, engineers and architects are fairly commonly interpreting Exception 3 as triggering the need for safety glazing on the exterior surfaces of the building. This does not appear to be the intent, but the provision is worded so confusingly that we have seen ground-floor, second-floor, and even third-floor windows being specified with or replaced with safety glazing on the exterior surface due to the poor wording of Exception 3. Of course, it makes zero sense to have a more stringent requirement for safety glazing on the exterior surfaces of the building (i.e., up to 25 feet above a roof or walking surface) than on theinterior (only where the glass is less than 18 inches above the walking surface). It also makes zero sense to require safety glazing on the exterior when the window is an IGU but not when the glass is single-pane. So something needs to be done. The question is what.

This proposal attempts to fix the existing format and make the requirement blind to whether a fall out of a building, a fall into a building, or a fall through a window that does not result in a person entering or leaving a building (e.g., an interior window with floor walking surface on both sides) is the concern. It recognizes that we probably do want to prevent situations where people on the exterior of the building (whether on a roof or adjacent walking surface) could fall through a window and INTO a building. This seems to be a dramatically less common occurrence than people falling through windows and OUT of a building, but it does appear to be a concern where windows are located at the roof level (e.g., a clerestory) or along a walkway that may be higher than the immediately adjacent floor in the building and a fall into a building could result in serious injury (beyond cuts) from the glass. However, because the existing provision is -- and has always been -- blind to the fall distance, the provision would presumably also need to address the concern of people falling into a building where the interior and exterior walking surfaces are coplanar.

So in this proposal, we suggest adding the words ", roof, or adjacent walking surface" to Conditions 2 and 3, and we are proposing to simplify Exception 3 to explain that for IGUs and window with multiple layers of glass, only the layer(s) on the sides of the window that can be impacted need to be safety glass. Note that the term "accessible" is already used in Exception 2.

So this proposal makes the requirements equal, whether the person could fall OUT through a window; THROUGH a window, but not out of the building; or IN through a window.

Note that another reasonable interpretation could be to assess the possibility of people falling INTO a building as exceedingly rare and not the intent of the original wording at all. Thus we could leave Conditions 2 and 3 alone and just reword Exception 3. Perhaps something along the lines of "**Exception 3. For windows with insulating glass units and windows with multiple layers of glass, these requirements only apply to the layer(s) of glass exposed to potential impact from the floor side(s).**" That, combined with the reason statement of this proposal, should be sufficient to make it clear that there is no intent to address the exceedingly rare occurrence of people falling through windows INTO buildings. To avoid cluttering up the hearing with multiple versions of this proposal, I will propose this secondary option as a Floor Mod.

Cost Impact: The code change proposal will increase the cost of construction
Although the most rational interpretation is that the intent of the current provision is to prevent people falling OUT through a window, Exception 3 is worded so poorly that designers are interpreting it as requiring safety glazing to prevent people from falling INTO a building. Since the consequences of that interpretation are so severe (i.e., glass whose bottom is up to 25 feet high) is being required to be safety glazing, this proposal will result in reduced costs where that interpretation is being taken. Conversely, this proposal will result in increased costs where the interpretation is that the current intent is to prevent people from falling THROUGH windows but only when the fall begins on the inside of the building (and they either end up on the outside of the building or they end up on the interior because they fell through an interior window), and that safety glazing is NOT required for any circumstance when people can fall INTO a building.

In the end, depending on the project, the application, and the interpretation, this proposal may either increase or decrease the cost of construction, and it is not possible to quantify this at all because it depends on all three variables. The best we can do is clean up the language so that the intent is clear (and, in this case, consistent as to whether the concern is people falling out of a building through a window, falling through an interior window but not leaving the building, or falling into a building through a window).

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor~~, roof,~~ or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor~~, roof,~~ or adjacent walking surface.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. Decorative glazing.

2. Where a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.

3. ~~For insulating glass units or windows with multiple layers of glazing, these requirements pertain only to the layer(s) on the accessible side(s) of the windows.~~ <u>Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 8 feet (2438 mm) or more above any grade or walking surface adjacent to the glass exterior.</u>

Committee Reason: Approved as modified as the proposal makes a logical change to where safety glass is required. The modification cleans up and clarifies the exception #3 of section 2406.4.3. (Vote: 14-0)

Final Hearing Results

S231-22	AM

S232-22

Original Proposal

IBC: 2406.5

Proponents: Thom Zaremba, Roetzel & Andress, National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, Roetzel & Andress, Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

2021 International Building Code

Revise as follows:

2406.5 Fire department access panels. Fire department glass access panels shall be of tempered glass. For multi-panel glass assemblies ~~insulating glass units~~, all panes shall be tempered glass.

Reason: If adopted, this proposal will make no technical changes to the requirements of Section 2406.1. The proposal is, simply, to make the language of this section of Chapter 24 consistent with another glass industry proposal to update the language of Section 2406.1 to include multi-pane glass assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is entirely editorial and makes no technical changes to the requirements of Section 2406.1. Consequently, there will be no increase or decrease in the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: Approved as submitted as the proposal updates the language consistent with industry terms. (Vote: 13-0)

Final Hearing Results

S232-22	AS

S234-22

Original Proposal

IBC: 2409.1

Proponents: John-Jozef Proczka, City of Phoenix, Self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Revise as follows:

2409.1 Glass walkways. Glass installed as a part of a floor/ceiling assembly as a walking surface and constructed with laminated glass shall comply with ASTM E2751 or with the *load* requirements specified in Chapter 16under the provisions of Section 104.11. Such assemblies shall comply with the *fire-resistance rating* and marking requirements of this code where applicable.

Reason: ASTM E2751 provides an obvious and robust method of compliance. However "or with the load requirements specified in Chapter 16" does not. Structural design has two primary sides: load and resistance. The current option completely leaves resistance requirements unknown and unspecified.
It is obvious that this type of glass walkway scenario would need engineered design to appropriate load resistance standards, but without invoking Section 104.11 it leaves this "option" confusingly specified, such that 104.11 may not be applicable.

Deleting "or with the load requirements specified in Chapter 16" is one possible solution to this problem, but then designs besides ASTM E2751 would need code modifications to overcome impracticality arguments.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal just clarifies that the alternative material, design, and method of construction provisions are applicable where ASTM E2751 is not followed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately clarifies that if an alternate to laminated glass is to be considered, it must be done in accordance with section 104.11. (Vote: 9-4)

Final Hearing Results

S234-22	AS

S235-22

Original Proposal

IBC: 2407.1.1

Proponents: Thom Zaremba, Roetzel & Andress, National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, Roetzel & Andress, Glazing Industry Code Committee (GICC) (nresetar@ralaw.com)

2021 International Building Code

Revise as follows:

2407.1.1 Loads. Glass *handrails* and guards and their support systems shall be designed to withstand the *loads* specified in Section 1607.9 . Glass *handrails* and *guards* shall be designed using a factor of safety of four.<u>Calculated stresses for the loads specified in Section 1607.9 shall be less than or equal to 3,000 psi (20.7 MPa) for heat strengthened glass and less than or equal to 6,000 psi (41.4 MPa) for fully tempered glass.</u>

Reason: An often asked question is: "How do you determine whether a glass handrail or guard is designed using a safety factor of four?" This code change proposal is intended to provide guidance to those designing glass handrails or guards to a factor of safety of four. First, the maximum stress carrying capabilities of the two types of glass that may be used in the design of glass handrails and guards - namely heat strengthened glass and fully tempered glass - must be known. These values are well known and published by the glass industry. (See bibliography). Heat strengthened glass is able to bear stresses of 12,000 psi while fully tempered glass is able to bear stresses of 24,000 psi. Second, the professional designing the glass handrail or guard must calculate the stresses applicable to the loads specified in Section 1607.9. Finally, to determine whether the glass handrail or guard will have a safety factor of four, the maximum published stresses for the type of glass being used, either heat strengthened glass or fully tempered glass, must be divided by 4. Those values - namely, 3,000 psi for heat strengthened glass and 6,000 psi for fully tempered glass - must, in turn, be less than or equal to the calculated stresses for the loads specified in Section 1607.9. If they are, the glass handrail or guard will be designed with a safety factor of four since the calculated stresses for the loads required by Section 1607.9 will be 1/4 or less of the stress carrying capability of the type of glass being used in the design.

Bibliography: National Glass Association - NGA Technical Paper FM 05-12 (2018) formerly FGMD 05-1212 (2018).
http://www.glassdynamicsllc.com/temperedglass.html

https://www.scientificamerican.com/article/how-is-tempered-glass-mad/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not change the cost of construction. It simply clarifies the glass stress values to be used and compared to the calculated stresses applicable to the loads specified in Section 1607.9 in order to determine whether a glass handrail or guard will achieve a factor of safety of four.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2407.1.1 Loads. Glass *handrails* and guards and their support systems shall be designed to withstand the *loads* specified in Section 1607.9 . <u>Calculated stresses in glass elements of *handrails* and *guards* due to these loads shall be limited to a maximum of 3,000 psi (20.7 MPa) for heat strengthened glass and 6,000 psi (41.4 MPa) for fully tempered glass.</u> ~~Glass *handrails* and *guards* shall be designed using a factor of safety of four. Calculated stresses for the loads specified in Section 1607.9 shall be less than or equal to 3,000 psi (20.7 MPa) for~~

~~heat strengthened glass and less than or equal to 6,000 psi (41.4 MPa) for fully tempered glass.~~

Committee Reason: Approved as modified as the proposal provides clear information for glass handrails and clarifies the intent of the section 2407.1.1. The modification removes a potential conflict and improves the wording. (Vote: 14-0)

Final Hearing Results

S235-22	AM

S239-22

Original Proposal

IBC: TABLE 2508.1, 2508.2, GA Chapter 35 (New)

Proponents: Tim Earl, GBH International, the Gypsum Association (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

TABLE 2508.1 INSTALLATION OF GYPSUM CONSTRUCTION

MATERIAL	STANDARD
Gypsum board and gypsum panel products	GA 216; ASTM C840
Gypsum sheathing and gypsum panel products	ASTM C1280; GA-253
Gypsum veneer base	ASTM C844
Interior lathing and furring	ASTM C841
Steel framing for gypsum board and gypsum panel products	ASTM C754; C1007

2508.2 Limitations. *Gypsum wallboard* or *gypsum plaster* shall not be used in any exterior surface where such gypsum construction will be exposed directly to the weather. *Gypsum wallboard* shall not be used where there will be direct exposure to water or continuous high humidity conditions. *Gypsum sheathing* shall be installed on exterior surfaces in accordance with ASTM C1280or GA-253.

Add new standard(s) as follows:

GA

Gypsum Association
962 Wayne Avenue, Suite 620
Silver Spring, MD 20910

GA-253-2021 Application of Gypsum Sheathing

Reason: This change will align the IBC with the IRC by adding this GA specification as an alternate to the ASTM standard. In practice there is no difference between the two documents. GA 253 is already referenced in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply adds a reference to an equivalent standard that is already referenced in the IRC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal, by bringing in the standard GA-253-2021, adds clarity to the section and consistency with the IRC . (Vote: 14-0)

Final Hearing Results

S239-22 AS

S240-22 Part I

Original Proposal

IBC: 2510.6

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

2510.6 Water-resistive barriers. *Water-resistive barriers* shall be installed as required in Section 1403.2 and, where applied over~~wood-based~~exterior sheathing, shall comply with Section 2510.6.1 or 2510.6.2.

Reason: While drainage is part of the general Weather Protection provisions in 1402.2 (unless a wall system demonstrates compliance under 1402.2 Exception 2), a means of achieving drainage in stucco systems is only explicit for systems over wood-based sheathing. There are other exterior sheathing materials that are sensitive to, and can be deteriorated by water. The provisions for explicit drainage have been included for stucco over wood-based sheathing for many years. While initially these provisions initially addressed stucco cracking due water-absorption by wood-based sheathing. The understanding of the purpose of two layer systems evolved over the years to focus on the drainage that two layer systems provide.[1] The code began including drainage for stucco systems over wood-based sheathing in 2006 and explicitly required drainage between the two layers of water-resistive barrier in 2012. The water management provisions were subsequently expanded to respond to regional climatic challenges. This proposal expands explicit drainage to stucco systems applied over any exterior sheathing. Documented stucco moisture issues have been reported and are not confined to wood-based sheathing systems. The protections provided by these requirements should be afforded to all sheathed construction.

Bibliography: 1) Theresa A. Weston, “Stucco Systems: A Review of Reported Data and Code and Standard Development”,*Proceedings of the 4th Residential Design & Construction Conference*, State College, PA, February 2018
2) Fine Homebuilding Editors, "Home-Building Cyclopedia, Water-Resistive Barriers" https://www.finehomebuilding.com/project-guides/insulation/water-resistive-barriers

3) Brian Pontolilo, "Rainscreen products for Stucco Installations", Green Building Advisor, July 5, 2019, https://www.greenbuildingadvisor.com/article/what-to-install-behind-stucco

4) Dave Barrett, "The Renewal of Trust in Residential Construction, Commission of Inquiry into the Quality of Condominium Construction in British Columbia", June 1998.

Cost Impact: The code change proposal will increase the cost of construction
The proposal will not increase the cost of construction for assemblies with wood-based sheathing, as there are no technical changes for these assemblies. However, the proposal will increase the cost of construction for stucco assemblies containing non-wood-based exterior sheathings. For dry climates the cost will be for adding a second layer of water-resistive barrier to the assembly. Housewrap, which is a representative water-resistive barrier, is estimated to cost $0.17 per square foot.[2] For moist and marine climates, there are a variety of systems which could be used to satisfy the requirements, with estimated costs ranging from $0.30 to $1.90 per square foot.[3] This first cost increase is balanced against potential future costs for remediation if moisture damage occurs. It has been reported that stucco remediation can cost up to 288% of the original cost of the stucco construction.[4]

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2510.6 Water-resistive barriers. *Water-resistive barriers* shall be installed as required in Section 1403.2 and~~, where applied over exterior sheathing,~~ shall comply with Section 2510.6.1 or 2510.6.2.

Exception: Sections 2510.6.1 and 2510.6.2 shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.

Committee Reason: Approved as modified consistent with the actions on S240-22 Part II. The modification expands on the water-resistive barriers by providing a needed exception. (Vote: 13-1)

Final Hearing Results

S240-22 Part I	AM

S240-22 Part II

Original Proposal

IRC: R703.7.3

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over ~~wood-based~~ exterior sheathing, shall comply with Section R703.7.3.1 or R703.7.3.2.

Reason: While drainage is part of the general Weather Protection provisions in 1402.2 (unless a wall system demonstrates compliance under 1402.2 Exception 2), a means of achieving drainage in stucco systems is only explicit for systems over wood-based sheathing. There are other exterior sheathing materials that are sensitive to, and can be deteriorated by water. The provisions for explicit drainage have been included for stucco over wood-based sheathing for many years. While initially these provisions initially addressed stucco cracking due water-absorption by wood-based sheathing. The understanding of the purpose of two layer systems evolved over the years to focus on the drainage that two layer systems provide.[1] The code began including drainage for stucco systems over wood-based sheathing in 2006 and explicitly required drainage between the two layers of water-resistive barrier in 2012. The water management provisions were subsequently expanded to respond to regional climatic challenges. This proposal expands explicit drainage to stucco systems applied over any exterior sheathing. Documented stucco moisture issues have been reported and are not confined to wood-based sheathing systems. The protections provided by these requirements should be afforded to all sheathed construction.

Bibliography: 1) Theresa A. Weston, "Stucco Systems: A Review of Reported Data and Code and Standard Development",*Proceedings of the 4th Residential Design & Construction Conference*, State College, PA, February 2018
2) Fine Homebuilding Editors, "Home-Building Cyclopedia, Water-Resistive Barriers" https://www.finehomebuilding.com/project-guides/insulation/water-resistive-barriers

3) Brian Pontolilo, "Rainscreen products for Stucco Installations", Green Building Advisor, July 5, 2019, https://www.greenbuildingadvisor.com/article/what-to-install-behind-stucco

4) Dave Barrett, "The Renewal of Trust in Residential Construction, Commission of Inquiry into the Quality of Condominium Construction in British Columbia", June 1998.

Cost Impact: The code change proposal will increase the cost of construction
The proposal will not increase the cost of construction for assemblies with wood-based sheathing, as there are no technical changes for these assemblies. However, the proposal will increase the cost of construction for stucco assemblies containing non-wood-based exterior sheathings. For dry climates the cost will be for adding a second layer of water-resistive barrier to the assembly. Housewrap, which is a representative water-resistive barrier, is estimated to cost $0.17 per square foot.[2] For moist and marine climates, there are a variety of systems which could be used to satisfy the requirements, with estimated costs ranging from $0.30 to $1.90 per square foot.[3] This first cost increase is balanced against potential future costs for remediation if moisture damage occurs. It has been reported that stucco remediation can cost up to 288% of the original cost of the stucco construction.[4]

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Modification: R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, ~~where applied over exterior sheathing~~, shall comply with Section R703.7.3.1 or R703.7.3.2.
Exception:
Sections R703.7.3.1 and R703.7.3.2 shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.

Committee Reason: The committee determined that the modification clarifies the proposal's intent where accumulation, condensation, or freezing of moisture will not damage the materials. The committee concluded that the modified proposal improves the scope of the water-resistive barrier application and recognizes materials that are not impacted (Vote: 8-2).

Final Hearing Results

S240-22 Part II	AM

S241-22 Part I

Original Proposal

IBC: 2510.6, 2510.6.1

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

2510.6 Water-resistive barriers. *Water-resistive barriers* shall be installed as required in Section 1403.2 and, where applied over wood-based sheathing, shall comply with Section 2510.6.1 or 2510.6.2.

Revise as follows:

2510.6.1 Dry climates.
One of the following shall apply for dry (B) climate zones:

1. The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of water-resistive barrier complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the water-resistive barrier, is directed between the layers.
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of*water-resistive barrier* complying with ASTM E2556, Type II. The*water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer~~, or a drainage space~~. A means of drainage, as prescribed in 1402.2, shall be provided to the exterior side of the water-resistive barrier.

Reason: This is a clarification of the Dry Climate Option 2 to emphasize that a means of drainage (as required in 1402.2) is included in the design of the water-resistive barrier system. It is consistent with interpretation of 1402.2 included in ICC-ES AC11 Acceptance Criteria for Cementitious Exterior Wall Coatings:

> **"**Details shall be submitted of a drainage system based on drainage performance testing. The applicant must submit a testing proposal to ICC-ES prior to testing. Precedent for a testing procedure can be found in the ICC-ES Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (AC235), Section 4.10."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal modifies the existing compliance option to describe how the requirements from other code sections are applied when using this option. The proposal improves the alignment between existing code requirements and industry practices.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

2510.6.1 Dry climates. One of the following shall apply for dry (B) climate zones:

1. The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of water-resistive barrier complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the water-resistive barrier, is directed between the layers.
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of*water-resistive barrier* complying with ASTM E2556, Type II. The*water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer<u>, or drainage space or means of drainage complying with 2510.6.2</u>. ~~A means of drainage, as prescribed in 1402.2, shall be provided to the exterior side of the water-resistive barrier.~~<u>Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier,* shall be directed to the exterior side of the *water-resistive barrier*.</u>

Committee Reason: Approved as modified as per the first sentence of the provided reason statement and consistent with the actions on S241-22 Part II. The modification provides necessary additions and direction. (Vote: 14-0)

Final Hearing Results

S241-22 Part I	AM

S241-22 Part II

Original Proposal

IRC: R703.7.3, R703.7.3.1

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over wood-based sheathing, shall comply with Section R703.7.3.1 or R703.7.3.2.

R703.7.3.1 Dry climates . In Dry (B) climate zones indicated in Figure N1101.7, *water-resistive barriers* shall comply with one of the following:

1. The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of a *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane. Flashing installed in accordance with Section R703.4 and intended to drain to the *water-resistive barrier* shall be directed between the layers.
2. The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of a *water-resistive barrier* complying with ASTM E2556, Type II. The*water-resistive barrier* shall be separated from the stucco by a layer of foam plastic *insulating sheathing* or other non-water-absorbing layer~~, or a designed drainage space~~. A means of drainage, as prescribed in R703.1.1, shall be provided to the exterior side of the water-resistive barrier

Reason: This is a clarification of the Dry Climate Option 2 to emphasize that a means of drainage (as required in 1402.2) is included in the design of the water-resistive barrier system. It is consistent with interpretation of 1402.2 included in ICC-ES AC11 Acceptance Criteria for Cementitious Exterior Wall Coatings:

> **"**Details shall be submitted of a drainage system based on drainage performance testing. The applicant must submit a testing proposal to ICC-ES prior to testing. Precedent for a testing procedure can be found in the ICC-ES Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (AC235), Section 4.10."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal modifies the existing compliance option to describe how the requirements from other code sections are applied when using this option. The proposal improves the alignment between existing code requirements and industry practices.

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Modification: R703.7.3.1 Dry climates . In Dry (B) climate zones indicated in Figure N1101.7, water-resistive barriers shall comply with one of the following:

1. The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of a water-resistive barrier complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane. Flashing installed in accordance with Section R703.4 and intended to drain to the water-resistive barrier shall be directed between the layers.

2. The water-resistive barrier shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of a water-resistive barrier complying with ASTM E2556, Type II. The water-resistive barrier shall be separated from the stucco by a layer of foam plastic insulating sheathing<u>,</u> ~~or~~ other non-water-absorbing layer, ~~or a designed drainage space. A means of drainage, as prescribed in R703.1.1, shall be provided to the exterior side of the water-resistive barrier~~ <u>or a drainage space or means of drainage complying with R703.7.3.2</u>. <u>Flashing installed in accordance with Section 703.4 and intended to drain to the water-resistive barrier shall be directed to the exterior side of the water-resistive barrier.</u>

Committee Reason: The committee decided that the modification clarifies the proposal's intent of the designed drainage space and gives a better understanding of the flashing requirements. The committee determined that the proposal as modified provides good clarification of the Dry Climate Option 2. The proposal also offers appropriate references to Section R703.7.3.2 for Moist or marine climates and Section R703.4 for Flashing (Vote:10-0).

Final Hearing Results

S241-22 Part II	AM

ADM1-22 Part I

Original Proposal

IBC: SECTION 202; IEBC: SECTION 202 (New); IFC: SECTION 202; IFGC: SECTION 202 (New); IMC: SECTION 202 (New); ISPSC: SECTION 202 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] LISTED.
Equipment, materials, products or services included in a list published by an organization acceptable to the*building official* and concerned with evaluation of products or services that maintains periodic inspection of production of *listed* equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. <u>Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.</u>

Reason: The proposed revision to the definitions for “Listed” recognizes that listing organizations may use other terms to identify “listed” equipment, products, or materials. Two examples of other terms used meet the definition of listed include “certified” and “classified”. The term “certified” is a more globally recognized term used by listing organizations compared to the term “listed”. The term “classified” has historically referred to building materials evaluated for specific performance aspects such as surface burning characteristics that has also been accepted by code officials as meeting the definition of “Listed".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply modifying the existing definitions of Listed, and adding a definition of Listed where one does not exist.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the addition of the terminology improves the definition and is something that is needed. (Vote: 8-5)

Final Hearing Results

ADM1-22 Part I AS

ADM2-22

Original Proposal

IBC: SECTION 202, SECTION 202 (New); IFC: SECTION 202, SECTION 202 (New)

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Building Code

Revise as follows:

[A] TOWNHOUSE.
A building that contains three or more attached townhouse units.~~A single-family *dwelling unit* constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides.~~

Add new definition as follows:

TOWNHOUSE UNIT

.
A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides.

Reason: This proposal coordinates with changes made by ADM5-19, Part 2, which was approved by the ICC membership last cycle. Part 2 included IRC changes to implement dividing the term "townhouse" into "townhouse" and "townhouse unit." Most occurrences of the term "townhouse" (which is a building containing 3 or more townhouse units) follow a phrase "one- and two-family dwellings," and it should be noted that a "townhouse unit" is defined as a single-family dwelling. Therefore, a phrase "one- and two-family dwelling and townhouse" conveys buildings with one-, two-, and three- or more dwelling units. There is no need to mention "townhouse unit" in these cases because a townhouse unit is a one-family dwelling located in a townhouse (which is a building containing 3 or more such units).
With this in mind, I reviewed the occurrences of the terms "townhouse" and "townhouses" in the IBC and IFC and determined that no additional changes are needed to correlate with the new definitions. There is no impact of the term "townhouse unit" in either code, beyond being needed to support the updated definition of "townhouse."

The IFC uses the term "townhouse" in Sections 903.3.1.3 and 1001.1, in addition to Appendix B. The townhouse unit definition must also be added because that term is used in the definition of townhouse. Last cycle, ICC members voted on ADM5-19 to support these updated definitions at the public comment hearing in response to a comment submitted by the Washington Association of Building Officials. That vote was affirmed in the OGCV by a substantial margin (84% support). To finish what was started last cycle in the IRC, the IFC and IBC need to be updated to correlate with the 2021 IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is intended to be editorial. It is simply updating terminology to match the IRC. There are no changes to how buildings are constructed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was based on the proponent's reason statement and that it eliminates potential confusion by providing alignment between codes. (Vote: 13-0)

Final Hearing Results

ADM2-22 AS

ADM13-22 Part I

Original Proposal

IBC: SECTION 104, 202; IEBC: SECTION 104, 202; IFC: SECTION 104, 202; IPMC: SECTION 105, 202; IWUIC: SECTION 104, 105, 202; IZC: [A] 104.7, [A] 104.7.1; IGCC: SECTION 104

Proponents: Robert Marshall, representing FCAC (fcac@iccsafe.org); Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org); Jeffrey Shapiro, representing Lake Travis Fire Rescue (jeff.shapiro@intlcodeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Primary sections and titles shown as deleted include the deletion of all sections and subsections within them. For clarity, the full text of these deletions are not shown.

2021 International Building Code

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved* by the *building official*.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION 104~~
~~DUTIES AND POWERS OF THE BUILDING OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION 104
DUTIES AND POWERS OF THE BUILDING OFFICIAL.

[A] 104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code.

[A] 104.2 Determination of Compliance. The building official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies, procedures, rules and regulations in order to clarify the application of this code's provisions. Such interpretations, policies, procedures, rules and regulations:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the building official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Tests shall be performed by a party acceptable to the building official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the building official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. A request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code,

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

[A] 104.2.3.4.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the building official.

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products. The alternate material, design or method of construction and product evaluated shall be within the scope of accreditation of the approved agency. Criteria used for the evaluation shall be identified within the report, developed using a process that includes input from the public and made available for review by the public.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The building official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the building official.

[A] 104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grant modifications for individual cases provided that the building official shall first find that one or more special individual reasons make the strict letter of this code impractical, that the modification is in compliance with the intent and purpose of this code, and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of the written request for and action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.2.4.1 Flood hazard areas. The building official shall not grant modifications to any provision required in flood hazard areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.

[A] 104.3 Applications and permits. The building official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.3.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the building official shall determine if the proposed work constitutes substantial improvement or repair of substantial damage. Where the building official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the building official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the building official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the building official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the building official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the building official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the building official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the building official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the building official for the purpose of inspection and examination pursuant to this code.

[A] 104.5 Identification. The building official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The building official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section 114.

[A] 104.7 Official records. The building official shall keep official records as required by Sections 104.7.1 through 104.7.5. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the building official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The building official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

[A] 104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the building official for either shall be in writing and shall be retained in the official records.

[A] 104.7.4 Tests. The building official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.5 Fees. The building official shall keep a record of fees collected and refunded in accordance with Section 109.

[A] 104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be personally liable, either civilly or criminally, and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for costs in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the building official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Material and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and approved.

Reason: Section 104 (Section 105 in the IPMC) appears in the IFC, IWUIC, IBC, IEBC, IRC, IgCC and IPMC and contains general requirements for the authority and duties of the code official. Among these authorities and duties is the review and approval of alternate methods. The primary purpose of this code change is to update Section 104 to reflect the current manner that alternate methods and materials are evaluated, and to differentiate between evaluations from accredited evaluation agencies and evaluations from others, such as engineers. These provisions have basically been the same since the first edition in 2000, with the exception that the section on "Research Reports" was added in 2003. Industry terminology and methods have evolved over the years.

This proposal revises general code enforcement provisions to improve organization, improve clarity, and supplement existing provisions to better align the code text with how the code is commonly applied. The end goal is to provide the same wording and procedures in all of the I-Codes with regard to the Duties and Responsibilities of the Code Official. Some of the codes contain unique provisions applicable to only that code. Those nuances are retained so there are some slight differences, but the formatting will be the same in each code and the language will generally bee the same in each code.

As stated earlier, this section has been in the code a long time, and it is believed that it initially envisioned an alternative product or method review and approval process on a project-by-project basis, with substantiating tests and calculations or analyses provided with each permit application. Currently, a more efficient system has evolved where the same product evaluation reports are used in numerous projects, across many jurisdictions, and for many conditions. This evolution causes the need to revise this section to reflect current procedures.

However, the need for designers to be able to apply for one-time approval needs to be maintained, and that is the reason that "research reports" is maintained. In this case, though, when a method or material is not addressed by the code, the code official needs more information on the process that the evaluator used to determine that the method or material complies with the intent of the code.

To achieve the common format, a template is shown below which includes comments on each of the sections. Since the wording in each code is intended to be the same, the outline is not shown for every code, however there is an underline/strikeout version for each code provided. The code change for each code is provided as delete and substitute. This was done because the autoformatting process in cdpACCESS did not provide a document to easily follow. The underline/strikeout versions show the specific changes.

The following template is from the IBC. The IBC, IFC, IRC, IEBC, IPMC, and IWUIC are formatted the same as this template, however some codes have additional unique provisions, and other codes don't contain all of these sections if they are not appropriate for the code content.

OUTLINE FOR PROPOSED SECTION 104

SECTION 104 DUTIES AND POWERS OF BUILDING OFFICIAL - same title used for each code

104.1 General. – This section has been subdivided with numbered/titled subsections to break up the existing paragraph and specifically state that the code official is authorized to determine compliance with the code. While always implied and applied in this manner, the code never specifically states this important fact.

104.2 Determination of Compliance. – reformatted to identify that when reviewing projects for compliance with the code, the code official can develop policies and procedures. It also specifically states that the developed policies and the project approvals are to be based on the intent of the code.

~~104.2.1~~ Listed compliance. – In cases where the code specifies a listing standard, it is common for a code official to accept things listed to that standard without further evaluating whether the standard is germane. When a product listing is appropriate, then the fact that the product is listed and installed in accordance with the listing specifications and the manufacturer's instructions becomes the approval of the product. This section is not included in all codes since not all codes require listed equipment.

~~104.2.2~~ Technical assistance. – Nearly all the codes provide for the code official to utilize technical assistance in some form or another. This section is included as a subsection for determining compliance and will be consistent throughout the I-Codes. It is derived from, and replaces, previous text that was originally developed for and limited to hazardous materials related provisions.

104.2.2.1 Cost. – the cost for technical assistance is borne by the applicant or owner. This was previously included in a preceding paragraph and has been separated into its own subsection.

104.2.2.2 Preparer qualifications. – states that the person or agency providing the technical report must be qualified. The code official has the ability to require that the report is stamped by a registered design professional, since not all reports may need to provide this. For example, a hazardous materials classification report often does not include engineering or design. The definition is added to codes that do not currently contain the definition, such as the IWUIC. This was previously included in a preceding paragraph and has been separated into its own subsection. The new text goes beyond simply recommending changes, recognizing that the report may be a source document, as opposed to a review of documentation prepared by others.

104.2.2.3 Content. – the technical report shall include an analysis and any recommended or necessary changes.

104.2.2.4 Tests. – Tests can often provide valuable information. Where a test standard isn't specified by this code or a reference standard, the code official may wish to conduct further evaluation of the suitability of the test method used as a basis. Testing can be performed by an approved agency or by any other party/organization approved by the code official. Proposed provisions for tests are largely derived from existing code text on this topic.

~~104.2.3~~ ~~104.11~~ Alternative materials, design and methods of construction and equipment. – All codes make reference to accepting some type of alternative. This section is placed under the general compliance approval section and revised to state that a proposed alternative cannot be something that is specifically prohibited by the code. If ICC members have previously voted to specifically disallow something, alternative methods should not be a means of avoiding such a prohibition. Nevertheless, a code modification would still provide an option to make exceptions for unique cases, as opposed to the door being open for an applicant to end run the intent of the code by presenting an analysis or alternative that suggests an alternative to a prohibition is OK. It is important to note that something not contemplated by the code would not be impacted by this statement. Not contemplated is not the same as a specific prohibition in the code.

104.2.3.1 Approval authority. – if the alternative is acceptable, then it is to be approved by the code official. This is from existing text.

104.2.3.2 Application and disposition. – the submittal for an alternative must be accomplished in writing. If it is not approved, the code official must so state in writing and provide reasons why it was not acceptable. This is largely from existing text, however, the requirement for a written application for alternatives was not previously located in this section, where it is appropriate to reference.

104.2.3.3 Compliance with code intent.– the alternative must comply with the code's intent.

104.2.3.4 Equivalency criteria. – the alternative must provide equivalency to the code's provisions. The list of characteristics to be addressed is included from the current code. The reference to fire-resistance is removed from the list and fire-resistance is included under safety with additional criteria regarding fire characteristics identified in Section 104.2.3.4.1.

104.2.3.4.1 Fire safety equivalency. – this section was added because "fire-resistance" was removed from the list in Section 104.2.3.4 and recognizing that fire-resistance is not the only fire related characteristic to be addressed. Fire-resistance is only one characteristic of safety with respect to fire. This section is added to clarify that the entire issue of performance under fire conditions is the concern. Previously, aspects of fire safety beyond fire resistance would have been evaluated as part of "safety" in the list with no additional guidance on what to consider. Performance under fire conditions also includes equivalency as to how the alternate will perform structurally when exposed to fire.

104.2.3.5 Tests. – this section is added so the code official can ensure that any testing conducted is performed to a scale that adequately represents the end use of the alternate. This has primarily been added in response to concerns related to Code Change F60-21, which modified Section 2603 to defer alternatives related to fire performance of foam plastics to Section 104.

104.2.3.6 ~~104.11.1 Research~~ Reports. This section is relocated and revised to address two different types of reports currently submitted for alternatives.

104.2.3.6.1 Evaluation reports. – This section is added to address reports generate by an approved agency. The definition of "approved agency" was added to several codes in the 2018 editions. The definition is proposed to be revised, as in the IBC, or added as a new definition codes do not contain this definition, as in the IFC. This evaluation report is conducted by an approved agency that is accredited to conduct the tests or evaluations appropriate for the alternative involved. When the applicant provides a product evaluation from an accredited product evaluation agency that uses publicly developed and available criteria for the evaluation, the code official may have increased confidence that the method used for the evaluation does result in a method or material that meets the intent of the code and is at least equivalent to code-prescribed construction. Public development of criteria allows for input from industry experts, the public, and building officials in determining the methods used to evaluate code intent and equivalence, somewhat similar to the code development process where consensus is important. The accreditation ensures that the organization uses a consistent process to perform the evaluations. This section is meant to reflect the current use of evaluation reports from accredited evaluation agencies or organizations.

104.2.3.6.2 Other reports. – this section is added to address reports generated by persons or agencies other than an approved agency. It specifies that the person or agency providing the report must be qualified and must be approved by the code official. The code official has the authority to require the stamp of a registered design professional. When an applicant provides an evaluation from other than an accredited agency, or from a source that does not use publicly developed and available criteria, the code official needs more information in order to perform a proper review. Not only does the code official need to evaluate the product, but also evaluate the method that the applicant has used to determine compliance with code intent and code equivalence. So, in that case, it is proposed that the applicant would also have to provide the criteria that was used to do the evaluation, justification for use of that criteria, and data used for the evaluation, so a complete review can be made.

104.2.3.7 Peer review. – this section is added to address a method of review currently utilized by many jurisdictions. The peer review is an outside, third-party review that is submitted to the code official for use in cases where a jurisdiction may not have qualified resource in-house to perform a sufficient review of an alternative compliance proposal. Again, the peer reviewer must be qualified and approved by the code official.

~~104.2.4 104.10~~ Modifications. – this section is relocated under the section of compliance. Minor edits occurred to provide consistent language throughout the codes.

104.2.4.1 ~~104.10.1~~ Flood hazard areas. – this section on flood hazard areas only appears in the IBC, IRC and IEBC. This section is relocated to follow the provisions for modifications.

104.3 ~~104.2~~ Applications and permits. – this section is relocated and revised to provide consistent wording.

~~104.3.1 104.2.1~~ Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. – this section on flood hazard areas only appears in the IBC, IRC and IEBC. This section is relocated to follow the provisions for modifications.

104.4 ~~104.6~~ Right of entry. – This section is relocated and revised to provide consistent wording. The issue of right of entry is the same with all enforcement issues.

~~104.4.1~~ Warrant. – this section was not found in all codes, so it was added to the IBC to provide the ability to utilize a warrant. This function is allowed by the courts and currently utilized by jurisdictions.

104.5 Identification. – no change

104.6 ~~104.3~~ Notices and orders. – relocated and revised for consistent wording.

104.7 ~~Department~~ Official records. – This section revised to provide consistent wording and is reformatted by creating subsections. Each subsection addresses a different type of record that the is to be retained. This format clarifies that these records are required to be maintained.

~~104.7.1~~ Approvals.

~~104.7.2~~ Inspections.

~~104.7.3~~ Code alternatives and modifications.

~~104.7.4~~ Tests.

~~104.7.5~~ Fees.

104.8 Liability. – this section deals with protection from liability of the code official. The sections are revised to provide consistent wording throughout all I-Codes.

~~104.8.1~~ Legal defense. – this section deals with legal defense for the code official. The sections are revised to provide consistent wording throughout all I-Codes.

104.9 Approved materials and equipment. – no change

~~104.9.1 Used materials~~ Material and equipment reuse. – this section addresses the reuse of materials and equipment. The section is revised to provide consistent wording throughout the codes to say that the code official must approve any materials to be reused.

~~104.4 Inspections.~~ – this section is relocated to 104.2.2. Some of the language in this section is not relocated since those portions are already covered in Section 110.

104.10 ~~Modifications~~ – this section is relocated to 104.2.4 for formatting.

~~104.10.1 Flood hazard areas~~ – this section is relocated to 104.2.4.1 for formatting.

104.11 ~~Alternative materials, design and methods of construction and equipment.~~ - this section is relocated to 104.2.3 for formatting.

~~104.11.1 Research reports.~~ - this section is relocated to 104.2.3.6 for formatting.

~~104.11.2 Tests.~~ - this section is relocated 104.2.2.4, 104.2.3.5 and 104.8.4 for formatting.

Additional unique changes are as follows:

1. Sections in IWUIC 105 are relocated to IWUIC 104, so Section 105 is deleted. This also occurs in the IgCC and IPMC.
2. The IZC has a completely different approach application and therefore, only the duplicated sections in the IZC are revised.
3. IWUIC 104.4 Subjects Not Regulated by this Code is relocated to Section 102.5 and IWUIC 104.5 Matters Not Provided For is relocated to Section 102.6 for consistency with IFC format. A minor change was made to the definition of "approved agency" which removes the repeat of the word that is to be defined, agency, and replaces it with organization. Another revision allows the agency to furnish product evaluation in addition to certification, since evaluation and certification are two different things. Evaluation is for materials and methods not addressed by the code, and certification is for materials and methods that are addressed by the code. It is intended that all I-Codes will be formatted in this fashion. There was not sufficient time to process these revisions through the PMG CAC, so only the codes under the review of the Fire CAC and Building CAC are submitted at this time. The revisions for the other codes will occur during Public Comment.

A strikeout/underline version of each code follows to identify specific revisions.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/.

The proposal in strikeout and underline text format can be viewed here:

https://www.cdpaccess.com/proposal/8550/25693/files/download/2955/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply reformats the code sections and provides consistency across the codes.

Public Hearing Results

Committee Action **As Modified**

The complete approved proposal including all of the approved committee modifications can be viewed in cdpACCESS as the public comment ready version.

https://www.cdpaccess.com/proposal/8550/26737/preview/

Committee Modification: 2021 International Building Code

[A] 104.2 Determination of Compliance. The building official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies~~,~~ and procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ and procedures~~, rules and regulations~~:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Where this code or a referenced standard requires equipment, materials, products or services to be listed and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an *approved* listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the building official.

~~**[A] 104.2.1 Listed compliance.**Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.~~

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the~~safety~~ properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Such tests shall be performed by a party acceptable to the building official.

[A] 104.2.3.2 Application and disposition. Where required, a ~~A~~ request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety, other than fire safety
6. Fire safety

~~**[A] 104.2.3.4.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* ~~accredited to evaluate or certify products~~ and use of the evaluation report shall require approval by thebuilding official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the building official's recognition ~~accreditation~~ of the *approved agency*. Criteria used for the evaluation shall be identified within the report and where required, provided to the building official.~~, developed using a process that includes input from the public and made available for review by the public~~.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.3 Applications and permits. The building official shall receive applications, review construction documents and issue permits ~~for the erection, and alteration, demolition and moving of buildings and structures~~, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.6 Notices and orders. The ~~building~~ code official shall issue necessary notices or orders to ensure compliance with this code. Notices of violations shall be in accordance with Section 114.

2021 International Existing Building Code

[A] 104.2 Determination of Compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies~~,~~ and procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ and procedures~~, rules and regulations~~:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Where this code or a referenced standard requires equipment, materials, products or services to be listed and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an *approved* listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the code official.

~~**[A] 104.2.1 Listed compliance.** Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the code official upon request.~~

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the~~fire safety~~ properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.3.2 Application and disposition. Where required, a ~~A~~ request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.**[A] 104.2.2.4 Tests.** Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Such tests shall be performed by a party acceptable to the building official.

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety, other than fire safety
6. Fire safety

~~**[A] 104.2.3.4.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* ~~accredited to evaluate or certify products~~ and use of the evaluation report shall require approval by the code official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the code official's recognition ~~accreditation~~ of the *approved agency*. Criteria used for the evaluation shall be identified within the report and where required, provided to the code official. ~~, developed using a process that includes input from the public and made available for review by the public.~~ **[A] 104.2.3.6.2 Other reports.** Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the ~~fire~~ code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.3 Applications and permits. The code official is authorized to receive applications, review construction documents and issue permits ~~for the repair and construction regulated by this code~~; inspect the premises for which such permits have been issued; and enforce compliance with the provisions of this code. **[A] 104.6 Notices and orders.** The code official shall issue necessary notices or orders to ensure ~~is authorized to issue such notices or orders as are required to affect~~ compliance with this code. Notices of violations shall be in accordance with Section 113.

2021 International Fire Code

[A] 104.2 Determination of Compliance. The fire code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies~~,~~ and procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ and procedures~~, rules and regulations~~:

1.	Shall be in compliance with the intent and purpose of this code.
2.	Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Where this code or a referenced standard requires equipment, materials, products or services to be listed and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an *approved* listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the fire code official.

~~**[A] 104.2.1 Listed compliance.** Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the fire code official upon request.~~

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the ~~fire safety~~ properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the fire code official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the fire code official shall approve the testing procedures. Such tests shall be performed by a party acceptable to the fire code official.

[A] 104.2.3.2 Application and disposition. Where required, a ~~A~~ request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved. **[A] 104.2.3.4 Equivalency criteria.** An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness

4. Durability
5. Safety, other than fire safety
6. Fire safety

~~**[A] 104.2.3.4.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

[A] 104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* ~~accredited to evaluate or certify products~~ and use of the evaluation report shall require approval by thefire code official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the fire code official's recognition ~~accreditation~~ of the *approved agency*. Criteria used for the evaluation shall be identified within the report and where required, provided to the fire code official.~~, developed using a process that includes input from the public and made available for review by the public~~.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.6 Notices and orders. The ~~fire~~ code official ~~is authorized to issue such notices or orders as are required to affect~~shall issue necessary notices or orders to ensure compliance with this code. Notices of violations shall be in accordance with Section~~s~~ 112~~.1 and 112.2~~.

2021 International Property Maintenance Code

[A] 105.2 Determination of Compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies~~,~~ and procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ and procedures~~, rules and regulations~~:

1.	Shall be in compliance with the intent and purpose of this code.
2.	Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 105.2.1.3 Content. The technical opinion and report shall analyze the~~safety~~ properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to identify and propose necessary recommendations.

[A] 105.2.2.2 Application and disposition. Where required, a~~A~~ request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

[A] 105.2.2.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety, other than fire safety
6. Fire safety

~~**[A] 105.2.2.4.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that~~

~~includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

[A] 105.2.2.5 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Such tests shall be performed by a party acceptable to the building official.

[A] 105.2.2.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 105.2.2.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* ~~accredited to evaluate or certify products~~ and use of the evaluation report shall require approval by the code official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the code official's recognition ~~accreditation~~ of the *approved agency*. Criteria used for the evaluation shall be identified within the report and where required, provided to the code official.~~, developed using a process that includes input from the public and made available for review by the public.~~

[A] 105.2.2.6.2 Other reports. Reports not complying with Section 105.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

~~[A] 105.2.2.6.2 Other reports. Reports not complying with Section 105.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.~~

~~**[A] 105.3 Inspections.** The code official shall have the authority to conduct inspections, or shall accept reports of inspection by approved agencies or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such approved agency or by the responsible individual.~~

[A] 105.6 Notices and orders. The code official shall issue all necessary notices or orders to ensure compliance with this code. Notices of violations shall be in accordance with Section ~~111.4~~109.

[A] 105.7.2 Inspections. The code official shall have the authority to conduct inspections, or shall accept reports of inspection by approved agencies or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such approved agency or by the responsible individual.

The ~~building~~ code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

2021 International Wildland-Urban Interface Code

[A] 104.2 Determination of Compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies~~,~~ and procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ and procedures~~, rules and regulations~~:

1.	Shall be in compliance with the intent and purpose of this code.
2.	Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1.3 Content. The technical opinion and report shall analyze the ~~fire safety~~properties of the design, operation or use of the building or premises, the facilities and appurtenances situated thereon and fuel management to identify and propose necessary recommendations.

[A] 104.2.2.2 Application and disposition. Where required, a ~~A~~ request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.**[A] 104.2.2.4 Equivalency criteria.** An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety, other than fire safety
6. Fire safety

~~**[A] 104.2.2.4.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

[A] 104.2.2.5 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the building official is authorized to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the building official shall approve the testing procedures. Such tests shall be performed by a party acceptable to the building official.

[A] 104.2.2.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.2.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* ~~accredited to evaluate or certify products~~ and use of the evaluation report shall require approval by the code official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the code official's recognition ~~accreditation~~ of the *approved agency*. Criteria used for the evaluation shall be identified within the report and where required, provided to the code official.~~, developed using a process that includes input from the public and made available for review by the public~~.

[A] 104.2.2.6.2 Other reports. Reports not complying with Section 104.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the ~~fire~~ code official. The code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.6 Notices and orders. The code official shall issue necessary notices or orders to ensure ~~is authorized to issue such notices or orders as are required to affect~~ compliance with this code. Notices of violations shall be in accordance with Section 110.2.

2021 International Green Construction Code

104.2 Determination of Compliance. The code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies~~,~~ and procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ and procedures~~, rules and regulations~~:

1.	Shall be in compliance with the intent and purpose of this code.
2.	Shall not have the effect of waiving requirements specifically provided for in this code.

104.2.1 Listed compliance. Where this code or a referenced standard requires equipment, materials, products or services to be listed and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an *approved* listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the code official.

~~**104.2.1 Listed compliance.** Determination of compliance for anything required by this code, or a reference standard, to be listed shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code,~~

~~or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the authority having jurisdiction upon request.~~

104.2.5.2 Application and disposition. Where required, a ~~A~~ request to use an alternative material, design or method of construction shall be submitted in writing to the building official for approval. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons the alternative was not approved.

104.2.5.4 Equivalency criteria. An alternative material, design, innovative approach or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety, other than fire safety
6. Fire safety

104.2.5.4.1 ~~Fire safety equivalency.~~ ~~Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

104.2.5.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Such tests shall be performed by a party acceptable to the authority having jurisdiction.

104.2.5.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.5.6.1 and 104.2.5.6.2.

104.2.5.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* ~~accredited to evaluate or certify products~~and use of the evaluation report shall require approval by the code official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the code official's recognition ~~accreditation~~ of the *approved agency*. Criteria used for the evaluation shall be identified within the report and where required, provided to the code official.~~, developed using a process that includes input from the public and made available for review by the public.~~

104.2.5.6.2 Other reports. Reports not complying with Section 104.2.5.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the authority having jurisdiction. The authority having jurisdiction is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

~~**104.4 Inspections.** The authority having jurisdiction shall have the authority to conduct inspections, as required, to determine code compliance, or the authority having jurisdiction shall have the authority to accept reports of inspection by approved agencies or individuals.~~

104.7 Notices and orders. The ~~authority having jurisdiction~~ code official shall issue all necessary notices or orders to ensure compliance with this code.

104.8.2 Inspections. The ~~authority having jurisdiction~~ code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

Committee Reason: The committee stated that the reasons for the approval of the modifications by number were as follows:
2: Safety and fire safety should be identified separately as the modification does and it is significantly easier to read especially for the new o small jurisdiction code officials.

19: It clears up the notices section and the items that were identified which is an improvement to the code.

24: It clears up some of the different concerns with the proposal and provides clarity to the sections as noted.

37: It furthers the family of changes in clarifications by improving the language.

38: It creates consistency between the codes.

39: It addresses concerns originally with an agency accredited to certify products by cleaning that up because as was mentioned, an engineering firm may not be accredited by anybody but it is appropriate for them to do this work.

40: It provides clarification and coordination between all the codes.

41: It addresses another concern with the original proposal that requires that the documentation be provided, and the modification allows for field approval of small modifications or alternatives.

The committee stated multiple reasons for approval as well as opposition to the proposal. In support, it was noted that overall the proposal was an improvement to the existing section and specifically the first two paragraphs are better than what is now in the code. The organizing of that portion is worth it and taken together with all the approved modifications the section is better than the current section. In opposition, it was stated that with all the modifications taken together with the complexity of the entire proposal, it is more than can be thoroughly evaluated at this point. (Vote: 9-4)

Final Hearing Results

ADM13-22 Part I	AM

ADM35-22

Original Proposal

IBC: [A] 104.11; IEBC: [A] 104.11; IFC: [A] 104.10; IFGC: [A] 105.2; IMC: [A] 105.2; IPC: [A] 105.2; IPSDC: [A] 105.2

Proponents: David Collins, The Preview Group, Inc, Self (dcollins@preview-group.com); Ronald Geren, RLGA Technical Services, LLC, The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, The American Institute of Architects, The American Institute o Architects (paulkarrer@aia.org)

2021 International Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be*approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:
   2.1. Quality.
   2.2. Strength.
   2.3. Effectiveness.
   2.4. *Fire resistance*.
   2.5. Durability.
   2.6. Safety.

Where the alternative material, design or method of construction is not approved, the*building official* shall respond in writing, stating the reasons why the alternative was not approved.

<u>**Exception:** Performance-based alternative materials, designs or methods of construction complying with the*ICC Performance Code*.</u>

Reason: The ICC Performance Code (ICCPC) should not be considered solely for whole building designs, but also as another pathway for evaluating alternative materials, designs, and methods of construction. When projects are designed per the prescriptive requirements of any ICC code, there are situations where a single material, element, or system cannot conform to the prescriptive requirements. Also, new materials, elements, or systems are entering the construction market at a pace that the prescriptive codes cannot keep up. This provision will allow owners, designers and building officials to consider such advances in such materials, elements of designs using the Performance Code for guidance.

Although the prescriptive provisions in each of the codes provides one pathway for approval of alternative materials, designs, and methods of construction, the ICCPC should not be overlooked as an alternative pathway. The ICCPC may be considered by the building official as an alternative method in and of itself per any of the sections listed, by including it within the text of each section will draw much greater attention to the ICCPC and thereby increase its use and adoption.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change to the above mentioned codes do not add a requirement that individual projects must comply with. It provides an additional option for those projects that wish to pursue more performance-based solutions. ICC's Cost Impact Guide cites code change proposals that modify the design requirements (e.g. greater number of design options, design process efficiencies) as recognized instance of proposals that do not affect the construction or construction cost. Providing projects a route to use the ICC Performance Code to evaluate materials, designs and methods of construction does not impact the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2021 International Building Code

[A]104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:
   2.1. Quality.
   2.2. Strength.
   2.3. Effectiveness.
   2.4. *Fire resistance*.
   2.5. Durability.
   2.6. Safety.

Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.

> **Exception:** Performance-based alternative materials, designs or methods of construction <u>and equipment</u> complying with the *ICC Performance Code*. <u>This exception shall not apply to alternative structural materials or to alternative structural designs</u>.

2021 International Existing Building Code

[A]104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

> **Exception:** Performance-based alternative materials, designs or methods of construction <u>and equipment</u> complying with the *ICC Performance Code*<u>. This exception shall not apply to alternative structural materials or to alternative structural designs</u>.

Committee Reason: The committee stated that the reason for the approval of the modification was that since the exception is referring to the performance code and if the performance code is not ready for structural type situations you need to have this exception in there to make sure that somebody doesn't try to use it for that purpose. The stated reasons for the approval were that this is another tool in the toolbox and owners can take advantage of this requirement and it brings more attention to it and this path especially with the modification. It was additionally stated that this proposal and the modification are critical as it brings another type of alternative that is performance based. (Vote: 7-6)

Final Hearing Results

ADM35-22 AM

ADM36-22 Part I

Original Proposal

IBC: [A] 104.11, [A] 104.11.1 (New), [A] 104.11.2 (New), [A] 104.11.1, [A] 104.11.2; IEBC: [A] 104.11, [A] 104.11.1 (New), [A] 104.11.2 (New), [A] 104.11.1, [A] 104.11.2; IFC: [A] 104.10, [A] 104.10.1 (New), [A] 104.10.2 (New), [A] 104.10.1, [A] 104.10.2; IFGC: [A] 105.2, [A] 105.2.1 (New), [A] 105.2.2 (New), [A] 105.2.1; IMC: [A] 105.2, [A] 105.2.1 (New), [A] 105.2.2 (New), [A] 105.2.1; IPC: [A] 105.2, [A] 105.2.1 (New), [A] 105.2.2 (New), [A] 105.2.1; IPMC: [A] 106.2, [A] 106.2.1 (New), [A] 106.2.2 (New); IWUIC: [A] 105.3, [A] 105.3.1 (New), [A] 105.3.2 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be*approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:
   2.1. Quality.
   2.2. Strength.
   2.3. Effectiveness.
   2.4. ~~*Fire resistance*.~~
   ~~2.5~~ 2.4. Durability.
   ~~2.6~~2.5. Safety.

Where the alternative material, design or method of construction is not approved, the*building official* shall respond in writing, stating the reasons why the alternative was not approved.

Add new text as follows:

[A] 104.11.1 Fire safety equivalency. Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.

[A] 104.11.2 Fire Tests. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the code official.

Revise as follows:

[A] ~~104.11.1~~ 104.11.3 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] ~~104.11.2~~ <u>104.11.4</u> Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an*approved agency*. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

Reason: The intent of this code proposal is to clarify equivalency in terms of fire safety, which is incorrect and misleading as described simply in terms of fire resistance at present. In fact, fire resistance is only a subset of all aspects of fire safety. Therefore, it is better to have a safety analysis look at the issue of fire safety more comprehensively.
As revised, fire resistance would be deleted from the list, and a separate section added that more fully addresses fire safety. A proper fire safety analysis performed under this section should always have taken these considerations into account, but having them specifically stated, and removing the incorrect term "fire resistance" item from the list will help code officials and code users by providing more thorough guidance for preparation of alternative method proposals. Additional guidance has also been provided to ensure that fire testing done in support of an alternative method proposal is of a sufficient scale to be relevant to the end use application.

This proposal is a portion of a more wide-ranging proposal that revises the entire section 104. The language relating to the fire safety aspects is identical to that agreed to for that proposal.

Equivalent changes are being proposed to all 9 ICC codes for which fire safety is a relevant issue in terms of alternate materials and methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact since this code proposal only clarifies the intent of the section and provides clearer guidance to the building, fire or code official.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2021 International Building Code

[A]104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be*approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:
   2.1. Quality.
   2.2. Strength.
   2.3. Effectiveness.
   2.4. Durability.
   2.5. Safety<u>, other than fire safety</u>
   ~~2.6~~ <u>Fire Safety</u>

Where the alternative material, design or method of construction is not approved, the*building official* shall respond in writing, stating the reasons why the alternative was not approved.

~~**[A] 104.11.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Existing Building Code

[A] 104.11 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be*approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, fire safety, and safety. Where the alternative material, design or method of construction is not*approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not*approved*.

~~**[A] 104.11.1Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Fire Code

[A] 104.10 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be*approved* where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, fire safety, and safety. Where the alternative material, design or method of construction is not*approved*, the *fire code official* shall respond in writing, stating the reasons why the alternative was not*approved*.

~~**[A] 104.10.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Fuel Gas Code

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be*approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, fire safety, and safety. Where the alternative material, design or method of construction is not*approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not*approved*.

~~**[A] 105.2.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion,~~

~~smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Mechanical Code

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, <u>fire safety,</u> and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

~~**[A] 105.2.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Plumbing Code

[A] 105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, <u>fire safety,</u> and safety. Where the alternative material, design or method of construction is not *approved*, the code official shall respond in writing, stating the reasons why the alternative was not *approved*.

~~**[A] 105.2.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Property Maintenance Code

[A] 106.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, <u>fire safety,</u> and safety. Where the alternative material, design or method of construction is not *approved*, the *code official* shall respond in writing, stating the reasons why the alternative was not *approved*.

~~**[A] 106.2.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

2021 International Wildland-Urban Interface Code

[A] 105.3 Alternative materials, design and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method shall be *approved* where the *building official* in concurrence with the fire chief finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, durability, fire safety, and safety. Where the alternative material, design or method is not*approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

~~**[A] 105.3.1 Fire safety equivalency.** Determination of safety equivalency, with respect to fire, shall be based on an analysis that includes applicable fire safety performance properties, such as but not limited to ignitability, flame spread, heat release rate, heat of combustion, smoke development, and fire resistance. Determination of safety equivalency, with respect to structural fire safety, shall also include a structural system analysis.~~

Committee Reason: The committee stated that the reason for the approval of the modification was that proposed fire safety equivalency section is not needed in the code. The stated reason for the approval of the proposal is that it correlates with the other code changes that were previously approved. (Vote: 13-0)

Final Hearing Results

ADM36-22 Part I	AM

ADM38-22 Part I

Original Proposal

IBC: [A] 105.2

Proponents: Joseph Summers, City of Groton, ICC Region VI (summersj@cityofgroton-ct.gov)

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2021 International Building Code

Revise as follows:

[A] 105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided that the floor area is not greater than 120 square feet (11 m^2).
2. Fences<u>, other than *swimming pool* barriers,</u> not over 7 feet (2134 mm) high.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.
5. Water tanks supported directly on grade if the capacity is not greater than 5,000 gallons (18 925 L) and the ratio of height to diameter or width is not greater than 2:1.
6. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any*basement* or *story* below and are not part of an *accessible route*.
7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated *swimming pools* accessory to a Group R-3 occupancy that are less than 24 inches (610 mm) deep, are not greater than 5,000 gallons (18 925 L) and are installed entirely above ground.
10. Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.
11. Swings and other playground equipment accessory to detached one- and two-family*dwellings*.
12. Window awnings in Group R-3 and U occupancies, supported by an*exterior wall* that do not project more than 54 inches (1372 mm) from the *exterior wall* and do not require additional support.
13. Nonfixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Electrical:

1. **Repairs and maintenance:** Minor repair work, including the replacement of lamps or the connection of*approved* portable electrical equipment to *approved* permanently installed receptacles.
2. **Radio and television transmitting stations:** The provisions of this code shall not apply to electrical equipment used for radio and television transmissions, but do apply to equipment and wiring for a power supply and the installations of towers and antennas.
3. **Temporary testing systems:** A *permit* shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliance.
2. Portable ventilation equipment.
3. Portable cooling unit.
4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any part that does not alter its approval or make it unsafe.
6. Portable evaporative cooler.
7. Self-contained refrigeration system containing 10 pounds (4.54 kg) or less of refrigerant and actuated by motors of 1 horsepower (0.75 kW) or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a *permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures and the removal and reinstallation of water closets, provided that such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Reason: Fences are used as the barrier to a swimming pool and this proposal provides continuity with the ISPSC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This only provides clarification

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that ISPSC has requirements for pool barriers and this change ensures that those requirements are still subject to a permit. It was also stated that this alleviates a potential conflict between the IBC and the ISPSC. (Vote: 13-0)

Final Hearing Results

ADM38-22 Part I	AS

ADM41-22 Part I

Original Proposal

IBC: SECTION 108, [A] 108.1, [A] 108.2, [A] 108.3, [A] 108.4, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3; IEBC: SECTION 107, [A] 107.1 , [A] 107.2, [A] 107.3, [A] 107.4, SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3; IFC: SECTION 106 (New), 106.1 (New), 106.2 (New), 106.3 (New), 106.4 (New), SECTION 110, [A] 110.1; IFGC: SECTION 110, [A] 110.1, [A] 110.2, 110.3, SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3, [A] 111.4; IMC: SECTION 107, [A] 107.1, [A] 107.2, [A] 107.3, [A] 107.4, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3; IPC: SECTION 107, [A] 107.1, [A] 107.2, [A] 107.3, [A] 107.4, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3; IPSDC: SECTION 109, [A] 109.1, [A] 109.2, [A] 109.3, [A] 109.4, SECTION 110, [A] 110.1, [A] 110.2, [A] 110.3; ISPSC: SECTION 106 (New), 106.1 (New), 106.2 (New), 106.3 (New), 106.4 (New), SECTION 109, [A] 109.1, [A] 109.2, [A] 109.3; IWUIC: SECTION 108, [A] 108.1, [A] 108.2, 108.3 (New), [A] 108.3, SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, Chair of PMGCAC (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

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2021 International Building Code

Revise as follows:

SECTION 108
TEMPORARY STRUCTURES ~~AND USES~~, EQUIPMENT AND SYSTEMS

[A] 108.1 General. The *building official* is authorized to issue a *permit* for temporary structures ~~and temporary uses~~, equipment or systems. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause.

[A] 108.2 Conformance. Temporary structures ~~and uses~~ shall comply with the requirements in Section 3103.

[A] 108.3 Temporary ~~power~~ service utilities. The *building official* is authorized to give permission to temporarily supply service utilities in accordance with Section 112. ~~and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.~~

[A] 108.4 Termination of approval. The *building official* is authorized to terminate such *permit* for a temporary structure, equipment, or ~~use~~ system and to order the ~~temporary structure or use~~ same to be discontinued.

SECTION 112
SERVICE UTILITIES

[A] 112.1 Connection of service utilities. A person shall not make connections from a utility, a source of energy, fuel, or power, or a water system or sewer system to any building or system that is regulated by this code for which a *permit* is required, until approved by the *building official*.

[A] 112.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 112.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The *building official* shall notify the serving utility, and wherever possible the *owner* or the owner's authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the *owner* or the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

Reason: The purpose of this proposal is coordination between codes for the section on temporary structures. A version was proposed last cycle, ADM32-19. As requested by the development committee, the BCAC worked with FCAC and PMGCAC to develop this proposal. This proposal modified the section for temporary facilities where it was already in the code. The committee felt that it was very important to add these safety options to the IFC as well, so this proposal adds this section to IFC and ISPSC. When looking for coordination, some of the codes did not include 'structure' and some did. The residential committee felt it was important to keep 'structures', so that is remaining in the proposed text.

Generally - The word use is moved to the front, and the lists are made the same throughout.

Temporary power - The allowances for temporary connection under inspection and testing address more than just utilities, so the language in this section should match. The phrase "certificate of completion" is not defined, so "approved" would be a better choice.

The section on Conformance includes a laundry list " structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary", that is not needed for the section and includes provisions that are not addressed in all of the codes (e.g. IPC does not address structural strength, means of egress, or light).

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across books. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals being submitted relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is only removing repeating requirements, therefore this revision is strictly editorial and will not have any changes to the construction requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that it coordinates the requirements for temporary structures across the codes using the same language while making it appropriate for each code. (Vote: 13-0)

Final Hearing Results

ADM41-22 Part I	AS

ADM43-22 Part I

Original Proposal

IBC: [A] 109.3; IEBC: [A] 108.3; IFC: 107.3; IFGC: 109.3; IMC: [A] 109.3; ISPSC: [A] 108.3; IWUIC: [A] 109.3; IGCC: 108.3

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 109.3 Permit valuations. The applicant for a *permit* shall provide an estimated ~~*permit*~~ value of the work for which the permit is being issued at time of application. ~~*Permit* valuations shall reflect~~ Such estimated valuations shall include the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. ~~If~~ Where, in the opinion of the *building official*, the valuation is underestimated ~~on the application~~, the *permit* shall be denied, unless the applicant can show detailed estimates ~~to meet the approval of~~ acceptable to the *building official*. ~~Final building *permit* valuation shall be set by the *building official*.~~ The building official shall have the authority to adjust the final valuation for permit fees.

Reason: The intent of this proposal is to coordinate the provisions for fees in the I-codes. Last cycle there were two different proposals to address consistency in the Fees section (ADM 27-19 and ADM 33-19) – the end result was coordination between the 2021 codes. for – IBC, IFC, IEBC, IMC, IPC, IPMC, IFGC, ISPSC, IWUIC and IZC.
The revisions to Section 109.3 is based on some concerns raised during discussion. The change to the first and second sentence is a clarification of application. The cost of the permit is the value of the work being performed, not the value of the permit. The current last sentence could be read to say the code official can arbitrarily set the permit valuation, or it could be read to say the code official had to calculate the valuation. The proposed language allows for the code official to make adjustments if warranted.

There is another code change to add this section to IPC. ADM27-19 was approved last cycle for the coordination of the Fees section in IMC, IPC, IPMC, IFGC, IPSPC. This section was left out of IPC by accident. This revised text has been submitted to be added to the IPC Section 109.3.

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across books. Most administrative and enforcement matters are the same for any code. Those matters unique for a specific code remain unchanged. This is one of a series of proposals being submitted relating to technical, editorial and organizational changes proposed for the Administrative chapters (Chapter 1) in all of the I-Codes.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that provides consistency between I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that the permit valuation needs to be in the hands of the building, code or fire code official and this change clarifies it by making it consistent across the other codes in a plain language correction. (Vote: 12-1)

Final Hearing Results

ADM43-22 Part I	AS

ADM48-22 Part I

Original Proposal

IBC: SECTION 113, [A] 113.1, [A] 113.2, [A] 113.3, [A] 113.4; IEBC: SECTION 112, [A] 112.1, [A] 112.2, [A] 112.3, [A] 112.4; IFC: SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3, [A] 111.4; IFGC: SECTION 113, 113.1, [A] 113.2, 113.3, 113.4; IMC: SECTION 114, [A] 114.1, [A] 114.2, [A] 114.3, [A] 114.4; IPC: SECTION 114, [A] 114.1, [A] 114.2, [A] 114.3, [A] 114.4; IPMC: SECTION 107, 107.1, [A] 107.2 , 107.3, 107.4; IPSDC: SECTION 112, [A] 112.1, 112.2, [A] 112.3, [A] 112.4; ISPSC: SECTION 111, [A] 111.1, [A] 111.2, [A] 111.3, [A] 111.4; IWUIC: SECTION 113, [A] 113.1, [A] 113.2, [A] 113.3, [A] 113.4; IGCC: SECTION 111, 111.1, 111.2, 111.3, 111.4

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Joseph J. Summers, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

SECTION 113
MEANS OF APPEALS

[A] 113.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *building official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *building of ficial.*

Revise as follows:

[A] 113.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code~~ or interpret the administration of this code~~.

[A] 113.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training~~to pass~~ on matters pertaining to~~ building construction~~ <u>provisions of this code</u> and are not employees of the jurisdiction.

[A] 113.4 Administration . The *building official* shall take i~~mmediate a~~ction in accordance with the decision of the board.

Reason: ADM40-19 was approved for IBC, IEBC, IFC, IWUIC, IPC, IMC, IFGC, ISPSC, IPMC, IPSDC, IECC-R and IGCC for revisions to the section on Means of Appeals. This item was disapproved for IECC Commercial and IRC. The result is an inconsistency with IECC Commercial and IRC.
The intent of this proposal is coordination for the means of appeals within the family of codes. Most of this was accomplished through ADM40-19 during the last cycle. Comments during the testimony, from the code development committees and subsequent discussions have suggested some improvements.

General: In the IRC and IECC Residential, the sentence about the code official not being a voting member of the board of appeals is proposed to be deleted. The fact about city employees not being a voting member of the board is already included in the section on qualifications. The code official is an important advisor for the Board of Appeals. The deletion of this sentence will not change that.

Limitation on authority. The deletion of ‘or interpret the administration of this code’ is proposed to be deleted so that the board could consider appeals on any part of the codes.

Qualifications: The phrase for experience and training is slightly different in each code. Adding this idea to all codes would provide consistency.

Administration: The IRC code change committee felt that 'immediate' was unreasonable. With the word removed, the board, or jurisdiction can set a reasonable timeframe.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (FCAC) and . ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021, the PMGCAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These are administration requirements, so there will be no change in construction requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was the proponent's reason statement which includes coordination of the codes. It was specifically noted that most jurisdictions have a single board of appeals that covers all the codes in that jurisdiction, so it is important to only have one set of requirements that is consistent within each code. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Robert Frances, Howard County (MD) Dept. of Inspections, Licenses, & Permits, Self (bfrances@howardcountymd.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[A] 113.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

2021 International Existing Building Code

[A] 112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training~~to pass~~ on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

Commenter's Reason: These are two minor editorial corrections to add the word "the" to Section 113.3 of the IBC, and striking out the words "to pass" from Section 112.3 of the IEBC.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This will have no cost impact on what has already been passed; it is editorial in nature only.

Public Comment 2

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[A] 113.4 Administration . The *building official* shall take action <u>without delay</u> in accordance with the decision of the board.

2021 International Existing Building Code

[A] 112.4 Administration. The *code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Fire Code

[A] 111.4 Administration. The *fire code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Fuel Gas Code

113.4 Administration. The *code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Mechanical Code

[A] 114.4 Administration. The code official shall take action <u>without delay</u> in accordance with the decision of the board.

2021 International Plumbing Code

[A] 114.4 Administration. The code official shall take action <u>without delay</u> in accordance with the decision of the board.

2021 International Property Maintenance Code

107.4 Administration. The *code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Private Sewage Disposal Code

[A] 112.4 Administration. The *code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Swimming Pool and Spa Code

[A] 111.4 Administration. The *code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Wildland-Urban Interface Code

[A] 113.4 Administration. The *code official* shall take action<u>without delay</u> in accordance with the decision of the board.

2021 International Green Construction Code

111.4 Administration. The authority having jurisdiction shall take action without delay in accordance with the decision of the board.

Commenter's Reason: Last cycle the Administrative Committee asked the BCAC to remove the word 'immediate' as it could be read to require the code official to respond immediately after the board made it's decision - as in that night immediately following the conclusion of the meeting. This proposal did that. However, after the spring hearings, BCAC received comments that no timeline could be read the opposite - in that a code official could delay indefinately. It is hope that 'without delay' is a reasonable compromise.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is an editorial correction with no changes to construction requirements.

Final Hearing Results

ADM48-22 Part I	AMPC1,2

ADM52 : ANSI/SPRI VF-1-22

Original Proposal

IBC: SPRI Chapter 35
Proponents:

2021 International Building Code

Revise as follows:

SPRI

Single-Ply Roofing Institute
465 Waverly Oaks Road, Suite 421
Waltham, MA 02452

ANSI/SPRI VF-1—~~17~~ 21 External Fire Design Standard for Vegetative Roofs

Reason: The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2021, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standard developers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Not applicable.

Public Hearing Results

Committee Action **As Submitted**

Final Hearing Results

ADM52 : ANSI/SPRI VF-1-22 AS

EB1-22

Original Proposal

IEBC: [A] 104.2.1, [A] 115.5, SECTION 202; IBC: [A] 116.5; IFC: [A] 114.6; IPMC: 111.9

Proponents: Gwenyth R. Searer, Wiss, Janney, Elstner Associates, Inc., myself (gsearer@wje.com)

2021 International Building Code

Revise as follows:

[A] 116.5 Restoration or abatement. Where the structure or equipment determined to be unsafe by the *building official* is restored to a safe condition, the owner, the owner's authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the *building official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, ~~rehabilitation~~ alteration, demolition or other approved corrective action. To the extent that repairs, *alterations* or *additions* are made or a *change of occupancy* occurs during the restoration of the structure, such *repairs*, *alterations*, *additions* and *change of occupancy* shall comply with the requirements of the *International Existing Building Code* .

Reason: This is an editorial change dealing with the term "rehabilitation".

Although one of the IEBC provisions affected by the change (i.e., dealing with restoration or abatement in the administrative portion of the code) is mirrored in the IBC, the IFC, and the IPMC, the only code where the term *rehabilitation* is actually defined is the IEBC. As such, it is important to understand how the IEBC treats various terms.

- The term *repair* is defined in Chapter 2 of the IEBC as "The reconstruction, replacement, or renewal of any part of an *existing building* for the purposes of its maintenance or to correct damage."
- The term *addition* is defined in Chapter 2 of the IEBC as "An extension or increase in floor area, number of stories, or height of a building or structure."
- The term *alteration* is defined in Chapter 2 of the IEBC as "Any construction or renovation to an *existing structure* other than a *repair* or an *addition*."

The IEBC goes to some effort to keep the possible categories of actions regarding modification of existing buildings simple: actions are either *repairs*, *additions*, or *alterations*. Period.

The term *rehabilitation*, on the other hand, is defined in Chapter 2 as "Any work, as described by the categories defined herein, undertaken in an *existing building*." Put another way, it means any permitted work to an existing building. Yet there are only three sections of the IEBC that actually use the term: Sections 104.2.1, 115.5, and 405.2.4.

The issues with the use of the word *rehabilitation* in Section 405.2.4 are structural in nature and are dealt with in a separate, independent proposal that does not rely on the outcome of this proposal.

This proposal only deals with Sections 104.2.1 and 115.5 in the IEBC.

- Section 104.2.1 talks about determining whether work on a building constitutes either *substantial improvement* or *repair* of *substantial damage*, so initially it might seem to make sense to include the word "rehabilitation" in this provision. A closer look, however, makes it clear that the term rehabilitation is superfluous in this provision. This section already specifically lists *repairs*, *alterations*, and *additions* as well as a catch-all "other improvement". Furthermore, the term *rehabilitation* is not included in definitions of either *substantial improvement* or *repair* of *substantial damage*, So *rehabilitation* is an extraneous term that is not needed in this section.
- Section 115.5 deals with restoration or abatement of *unsafe* conditions. At first blush, use of the term *rehabilitation* might almost seem to make sense here, but again a closer look makes it clear that the term is superfluous. The sentence that contains the term *rehabilitation* mentions *repairs*, demolition, and a catch-all "other approved *corrective* action". Rather than having two catch-all terms, it would be better to replace *rehabilitation* with a more specific term that makes more sense in the context of making a change: *alteration*. As a reminder, *alteration* is defined as "Any construction or renovation to an *existing structure* other than a *repair* or an *addition*." So the word *alteration* is more fitting in this section than *rehabilitation*.

Given that the term *rehabilitation* is specifically, and somewhat illogically. defined in the IEBC as an all-inclusive term covering all possible actions on a building, given that the definition is counter to the ordinarily accepted meaning of "rehabilitation," and given that the term is barely used in the IEBC (and in a superfluous, duplicative, and arguably confusing manner), it makes sense to delete the term from the definitions in Section 202 of the IEBC.

Since Section 115.5 in the IEBC is mirrored exactly in the IBC (Section 116.5), in the IFC (Section 114.6), and in the IPMC (Section 111.9), it makes sense to make the same changes to these sections (i.e., replace *rehabilitation* with the term *alteration*) to maintain consistency between the various codes and because an alteration is what you are doing if you are not repairing.

Although the term "rehabilitation" occurs in a few other locations in those four other codes, it was never defined in those codes, and it makes more sense to use the ordinarily accepted meaning of "rehabilitation" in these instances (e.g.., returning something to a good condition -- Cambridge Dictionary), so deletion of the definition from the IEBC makes more sense here as well..

Note that the IMC, the IPC, the IFGC, and the ISPSC contain their own similar but not identical set of provisions and generally use the term "rehabilitate" in its ordinarily accepted meaning; however, those provisions are not identical to the IEBC provisions, so are not proposed for modification herein.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change that merely removes the word "rehabilitation" from the IEBC because that word is superfluous and its intent and meaning are already captured in the other portions of the provisions proposed for modification. Since four other codes copy the wording in the IEBC about how to deal with unsafe conditions, these codes are also proposed for modification to match what is being proposed in the IEBC.

Deletion or replacement of the word will have zero impact on the scope of these codes or how they address unsafe conditions; consequently, this proposal has zero impact on the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved based upon the reason statement and the fact that the term "rehabilitation" is an umbrella term that is not necessary. The term is not used within the technical portions of the code. (Vote: 9-5)

Final Hearing Results

EB1-22	AS

EB2-22

Original Proposal

IEBC: SECTION 202; IBC: SECTION 202

Proponents: Gwenyth R. Searer, Wiss, Janney, Elstner Associates, Inc., myself (gsearer@wje.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BS] DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed *dangerous*:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.

2. There exists a significant risk of collapse, detachment or dislodgment of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine, or frequent *loads;* under actual loads already in effect; or under snow, wind, rain, *flood,* earthquake aftershock, or other environmental loads when such*loads* are imminent.

Reason: This is a change that was suggested back in 2019 during the development of the existing language; however, it was never formally proposed to the Structural Committee. Since the current language was adopted, a question has been raised about whether earthquake loads should be considered "imminent" if, say, a region of the country is "due" for an earthquake. That is not the intent of this definition.
Earthquakes that occur with recurrence intervals of hundreds to thousands of years (e.g., design-level events) are not and should not be considered "imminent". We lack the technology to predict when such large, essentially random events are likely to occur. We do know, however, that after a large earthquake, aftershocks are likely to occur, with the vast majority of aftershocks happening within hours to a few days of the initial earthquake. These are the earthquakes that can and should be considered "imminent". If a significant earthquake occurs, the aftershocks that are likely to occur soon thereafter are rightly considered "imminent." So if a building is damaged due to an earthquake, the building should be considered "dangerous" if there is a significant risk of collapse due to an earthquake aftershock that may occur in the coming hours to days.

This proposal clarifies the intent regarding earthquakes that should be considered, and brings the language regarding earthquakes into alignment with the other loads that are intended to be "imminent". Examples include snow loads when a winter storm is approaching, wind loads from an approaching storm, rain loads due to an approaching rainstorm, and flood loads when a flood is expected due to an approaching rainstorm or hurricane,

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial clarification of the intent; the proposal is not intended to change the existing scope of the term "dangerous".

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IBC-STRUCTURAL COMMITTEE.

Committee Reason: Approved based on the reason statement provided and that adding the word 'aftershock' after 'earthquake' provided needed clarification. (Vote: 12-2)

Final Hearing Results

EB2-22	AS

F1-21

Original Proposal

IFC: SECTION 202; IBC: SECTION 202

Proponents: Mark Hopkins, TERPconsulting, TERPconsulting (mhopkins@terpconsulting.com)

2021 International Building Code

Revise as follows:

[F] AUTOMATIC SPRINKLER SYSTEM. ~~An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which *automatic* sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the *fire area*.~~ <u>An automatic sprinkler system is an integrated network of piping designed in accordance with fire protection engineering standards, commonly activated by heat from a fire and discharges water over the fire area, that consists of sprinklers, a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern.</u>

Reason: The definition of *automatic sprinkler system* is no longer consistent with the definition in the referenced standard. The definition in Section 202 aligns with the definition found in NFPA 13 (2010) which has been modified several times over past several revision cycles, e.g. 2013, 2016 and 2019 editions of NFPA 13. It is recommended to replace the definition for *automatic sprinkler system* with a definition consistent with the current edition of NFPA 13 (2019).
The importance of this change is to clarify that in a multiple story building, or a building having a footprint exceeding the area limitations of NFPA 13 for a single sprinkler system (52,000 sf or 40,000 sf), would be considered to have one system based on the definition included in Section 202; however, the building would be considered to have multiple systems based upon the definition in NFPA 13 (2019). For example, a 32-story high-rise building having a footprint area of 50,000 sf per floor would be considered as having a single sprinkler system based on the current definition included in Section of 202 while it would be considered as having 32 or more systems based on the definition included of NFPA 13 (2019). Similarly, in a single-story building having an area of 80,000 sf would be considered as having a single sprinkler system based on the definition in Section of 202 while it would be considered as having 2 or more systems based on the definition of NFPA 13 (2019).

The definition could also have an impact on the application of inspection, testing and maintenance requirements since NFPA 25 (2020 and prior eds.) provides system related requirements. Using the example above with respect to internal examination of sprinkler piping per system based on the 5 yr. requirement of NFPA 25. A 32-story high-rise building having a single sprinkler system could be interpreted as requiring four (4) internal examination points for the entire building while NFPA 25 would require four (4) internal examination points in sprinkler systems on alternating floors (e.g. 16 systems) resulting in 64 examination points.

It is recommended to replace the definition to allow for consistency between the*International Building Code* and its referenced standards to ensure consistency in application in all jurisdictions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Changing the definition does not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that the proposal aligns the code definition with the referenced standard definition which the designers are currently using and it improves the code and makes it consistent with the standards. (Vote: 12-2)

Public Comments

Public Comment 1

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

AUTOMATIC SPRINKLER SYSTEM .

<u>An automatic sprinkler system is an integrated network of piping and fire sprinklers designed in accordance with fire protection standards.</u>

~~An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.~~

2021 International Building Code

[F] AUTOMATIC SPRINKLER SYSTEM .

<u>An automatic sprinkler system is an integrated network of piping and fire sprinklers designed in accordance with fire protection standards.</u>

~~An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which *automatic* sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the *fire area*.~~

Commenter's Reason: The current and proposed definitions contain extraneous and incomplete text and are unnecessarily complicated. The alternative in this public comment eliminates "commonly..." "generally..." and other unnecessary text. It also clarifies that sprinkler standards may or may not be viewed as "engineering" standards. Whether they are or aren't isn't necessary to a definition and avoids legal questions regarding who may or may not be qualified to use such a standard.
I am a consultant to NFSA but this proposal is my own and is not submitted on NFSA's behalf

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
No technical change to code application.

Final Hearing Results

F1-21	AMPC1

F3-21

Original Proposal

IFC: SECTION 202; IBC: SECTION 202

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] FLAMMABLE GAS.

A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)],~~which also meets one of the following~~ subdivided as follows:

1. ~~Is~~ Category 1A.
    1. A gas which is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with airh.~~as~~
    2. A gas with a flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limitunless data shows compliance with Category 1B.
2. Category 1B.

    A gas which meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one or more of the following:

    1. A lower flammability limit of more than 6% by volume in air; or
    2. A fundamental burning velocity of less than 3.9 in/s (10 cm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term "flammable gas" includes both Category 1A and 1B.

Reason: In the 7th edition of the Global Harmonization System of Classification and Labelling of Chemicals (GHS) the classification of flammable gas was expanded. Flammable gases have three categories, Category 1A, Category 1B, and Category 2. The definition is revised to be consistent with the GHS. However, some of the subgroups of Category 1A are not identified since all of the subclass still fall within Category 1A. Not included in the definition are pyrophoric (flammable) gas and chemically unstable (flammable) gas. Within these two additional terms is a requirement that the gas must first meet the Category 1A definition. Hence, including these terms becomes unnecessary in the Fire Code. GHS also defines a Category 2 flammable gas. The definition of a Category 2 flammable gas is: Category 2 - A gas not meeting the criteria of Category 1A or 1B, which, at 68°F (20 °C) and a pressure of 14.7 psia (101 kPa), has a flammable range while mixed in air. It is recommended that ICC consider adding a note in the commentary that Category 2 flammable gases are not regulated as flammable gases in the Fire Code, however, GHS has a classification for such flammable gases.

The GHS table on flammable gases is as follows:

Table 2.2.1: Criteria for categorisation of flammable gases

Category			Criteria
1A	**Flammable gas**		Gases, which at 20 °C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B
	Pyrophoric gas		Flammable gases that ignite spontaneously in air at a temperature of 54 °C or below
	Chemically unstable gas	**A**	Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa
		B	Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a pressure greater than 101.3 kPa
1B	**Flammable gas**		Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: (a) a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s;
2	**Flammable gas**		Gases, other than those of Category 1A or 1B, which, at 20 °C and a standard pressure of 101.3 kPa, have a flammable range while mixed in air

NOTE 1: *Ammonia and methyl bromide may be regarded as special cases for some regulatory purposes.*

NOTE 2: *Aerosols should not be classified as flammable gases. See Chapter 2.3.*

NOTE 3: *In the absence of data allowing classification into Category 1B, a flammable gas that meets the criteria for Category 1A is classified per default in Category 1A.*

NOTE 4: *Spontaneous ignition for pyrophoric gases is not always immediate, and there may be a delay.*

NOTE 5: *In the absence of data on its pyrophoricity, a flammable gas mixture should be classified as a pyrophoric gas if it contains more than 1% (by volume) of pyrophoric component(s).*

Category 1A flammable gases have a higher flammability and become explosive. These are the flammable gases typically understood such as propane, acetylene, and butane. Category 1B flammable gases have a lower flammability and are not inherently explosive, although all flammable gases can have a deflagration under the right conditions. A typical Category 1B flammable gas would be difluoromethane. The gas has a lower flammable limit of 13.8 percent and an upper flammable limit of 29.9 percent. The burning velocity is 6.7 cm/s or 2.6 in/s. Other Category 1B flammable gases would include: 1,1,1-trifluoroethane; and 2,3,3,3-tetrafluoro-1-propene. Trans-1,3,3,3-tetrafluoro-1-propene and ammonia are a Category 2 flammable gas.The last statement in the definition is to clarify that when not indicated, the term flammable gas applies to both Category 1A and Category 1B. When appropriate, the section in the code will state, “Category 1A flammable gas” or “Category 1B flammable gas.”

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change neither increases or decreases the cost of construction. The change only impacts the classification of flammable gases, thus there are no other technical changes to the code through this revision of the definition.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it appropriately breaks down the classification of flammable gases in two categories. This will assist in safely addressing the new types of refrigerants and provides a better framework as to how they need to be regulated. (Vote: 14-0)

Final Hearing Results

F3-21	AS

F15-21 Part II

Original Proposal

IBC: SECTION 202 (New), SECTION 202, [BF] 1505.10, [BF] 1507.15.1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

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Add new definition as follows:

LANDSCAPED ROOF

.

An area on a roof incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of a roof assembly.

Revise as follows:

[BS] VEGETATIVE ROOF.
A roof ~~An~~ assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

[BF] 1505.10 Vegetative ~~Landscaped~~ roofs. Vegetative ~~Landscaped~~ roofs shall comply with Sections 1505.1 and 1507.15 and shall be installed in accordance with ANSI/SPRI VF-1.

[BF] 1507.15.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed on the roof by the *vegetative roof* or landscaped roofs shall comply with the fire resistance rating requirements of Table 601.

Reason: This is an editorial proposal covering both the IFC and the IBC to consistently use the term "vegetative roof".
The term "landscaped roofs" has been used by the public interchangeably with "vegetative roofs". This has created confusion in the building code and conflicts with industry standards that have coalesced around the term "vegetative roof". . Moreover, some of the sections presently identified as "landscaped roofs" should refer to "vegetative roofs" as they really addresses roofs that are part of the building envelope and, thus, are associated with the existing definition of "vegetative roofs". In these locations, the code is revised to properly use "vegetative roof". In other places, both terms are retained as the language could apply either to a vegetative roof where the membrane, growth medium and vegetation are incorporated as part of the roof assembly, or a landscaped roof where planters, hardscapes, or other features are provided above the roof assembly and not integrated into it. A definition for "landscaped roof" is proposed to capture such features and better distinguish between a true "vegetative roof" as defined in the IBC and industry standards.

Neither the IFC nor the IBC define the term "landscaped roof", but the IBC does contain a definition for the term "vegetative roofs" that reads as follows.

[BS] VEGETATIVE ROOF. *An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.*

This proposal also copies the existing definition from the IBC to the IFC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and will not impact how vegetative and landscaped roofs are designed and constructed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal coordinates the proper terminology. The proposal covers both the IFC and the IBC to use the term “vegetative roof" consistently”. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Protected Membrane Roofing Institute (ccollins@kellencompany.com); John Woestman, Kellen Co., Extruded Polystyrene Foam Association (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

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LANDSCAPED ROOF

.

An area ~~on~~ over a roof assembly incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of ~~a~~ the roof assembly.

[BS] VEGETATIVE ROOF .
A roof assembly of interacting components designed to waterproof a building’s top surface that includes, by design,~~vegetation and related landscape elements.~~a vegetative surface.

Commenter's Reason: This public comment adds clarity to the definitions in the original proposal. The original definitions contradicted themselves by saying that a Landscape Roof was not part of a roof assembly only to have the Vegetative Roof definition included it as part of its assembly. This clarifies the intent of the proposal and will prevent interpretation issues in the field.
This proposal coordinates with F15 part 1.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The changes made in the original proposal and public comment do not affect the cost of construction. The modifications only clarify the intent of the language.

Public Comment 2

Proponents: Marcelo Hirschler, GBH International, self (mmh@gbhint.com); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Mike Nugent, Chair, ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

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[BF] 1505.10 ~~Vegetative~~ Landscaped and vegetative roofs . ~~Vegetative~~ Landscaped and vegetative roofs shall comply with Sections 1505.1 and 1507.15. Vegetative roofs ~~and~~ shall be installed in accordance with ANSI/SPRI VF-1.

Commenter's Reason: Proposal F16 Part II was approved as submitted and contains the language proposed in this public comment for section 1505.10. The language in F16 part II is the correct one because the fire test needs to apply to all types of roofs (and that is covered by 1505.1 and 1507.16) while the SPRI standard covers installation but only for vegetative roofs.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is still editorial and corrects an error in the original proposal.

Final Hearing Results	
F15-21 Part II	AMPC1,2

F16-21 Part II

Original Proposal

IBC: [BF] 1505.10

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[BF] 1505.10 Landscaped and Vegetative roofs. Landscaped and vegetative roofs shall comply with Sections 1505.1 and 1507.15. Vegetative roofs ~~and~~ shall be installed in accordance with ANSI/SPRI VF-1.

Reason: The term "landscaped roofs" has been used by the public to mean the same as "vegetative roofs" but it is used with a different meaning in ICC codes.The IBC defines vegetative roofs as follows:
VEGETATIVE ROOF. An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

This means that vegetative roof is a term that refers specifically to roof systems that are part of the building envelope. Moreover, it is clear Section 317 really should refer to "vegetative roofs" because they really address roofs that are part of the building envelope and, thus, are associated with the existing definition of "vegetative roofs". Therefore, the term "landscaped roofs" is unnecessary and should be replaced by the defined term "vegetative roofs" in this section.
Moreover, the language in the IFC in the set of sections 317, which applies to "vegetative roofs", needs to contain requirements that are consistent with those in the present edition of the SPRI VF-1 standard. However, in actual fact, the language in the IFC is that Sections 317.2, 317.3 and 317.4 are based on an old edition of the SPRI VF-1 standard and, thus, most of the requirements are unnecessary.

Note that Section 1505.10 of the IBC requires that vegetative roofs be installed per the SPRI VF-1 standard. Thus, this proposal simply cleans up section 317 of the IFC and replaces the term "landscaped roofs" with "vegetative roofs". It also clarifies that section 1505.10 of the IBC (controlled by the IFC) applies to both vegetative roofs and landscaped roofs and that the SPRI standard contains the requirements for vegetative roofs. The fire classification for all types of such roofs is contained in section 1505.1 of the IBC and is not delegated to the SPRI industry standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will not impact how vegetative roofs are designed and constructed as both the IBC and IFC will refer to the same edition of the SPRI standard.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal properly correlated terminology. The term "landscaped roofs" has been used by the public to mean the same as "vegetative roofs". Also, based on the committee's action on F15-21 Part II. (Vote: 12-1)

Final Hearing Results

F16-21 Part II	AS

F31-21

Original Proposal

IFC: 508.1.6; IBC: [F] 911.1.6

Proponents: Kevin Brinkman, National Elevator Industry, Inc., National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Building Code

Revise as follows:

[F] 911.1.6 Required features. The fire command center shall comply with NFPA 72 and shall contain all of the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system *annunciator*.
4. *Annunciator* unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The fire fighter’s control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking *interior exit stairway* doors simultaneously.
8. Sprinkler valve and waterflow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core,*means of egress*, fire protection systems, fire fighter air replenishment system, fire-fighting equipment and fire department access and the location of *fire walls, fire barriers, fire partitions, smoke barriers* and *smoke partitions*.

13. An *approved* Building Information Card that contains, but is not limited to, the following information:
    13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor), and the estimated building population during the day, night and weekend.
    13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager and building engineer and their respective work phone number, cell phone number, e-mail address.
    13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns, and roof assembly.
    13.4. *Exit access* and *exit stairway* information that includes: number of *exit access* and *exit stairways* in the building, each *exit access* and *exit stairway* designation and floors served, location where each *exit access* and *exit stairway* discharges, *interior exit stairways* that are pressurized, *exit stairways* provided with emergency lighting, each *exit stairway* that allows reentry, *exit stairways* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby, location of freight elevator banks.
    13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service.
    13.6. Fire protection system information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers, location of different types of *automatic sprinkler systems* installed including, but not limited to, dry, wet and pre-action.
    13.7 Hazardous material information that includes: location of hazardous material, quantity of hazardous material.
14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.
18. Elevator emergency or standby power selector switch(es), ~~where emergency or standby power is provided~~ <u>in accordance with ASME A17.1/CSA B44</u>
    .

Reason: To clarify that the criteria for when a switch is required is found in ASME A17.1/CSA B44 and that the IBC and IFC requirements are to indicate where the switch is located in the building. This is consistent with the language for the fire recall switch. No switch is needed if the emergency or standby power is sufficient to operate all elevators and associated equipment simultaneously. See also corresponding change to IBC 911.1.6.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost does not change since the proposed change is just a clarification of current requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal appropriately provides the necessary reference to ASME A17.1/CSA B44 for the requirements for emergency or standby power selector switches that are required in a fire command center. (Vote: 12-2)

Final Hearing Results

F31-21 AS

F32-21

Original Proposal

IFC: SECTION 202 (New), CHAPTER 5, SECTION 510, 510.1, 510.2, 510.3, 510.4, 510.4.1, 510.4.1.1, 510.4.1.2, 510.4.1.3, 510.4.2, 510.4.2.1, 510.4.2.2, 510.4.2.3, 510.4.2.4, 510.4.2.5, 510.4.2.6, 510.4.2.7, 510.4.2.8, 510.5, 510.5.1, 510.5.2, 510.5.3, 510.5.4, 510.5.5, 510.6, 510.6.1, 510.6.2, 510.6.3, 510.6.4, 1103.2; IBC: CHAPTER 9, SECTION 918, [F] 918.1

Proponents: Alan Perdue, Safer Buildings Coalition, Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

Revise as follows:

SECTION 918 EMERGENCY RESPONDER COMMUNICATION ~~COVERAGE~~ENHANCEMENT SYSTEMS

[F] 918.1 General. In-building ~~two-way~~ emergency responder communication ~~coverage~~ enhancement systems shall be provided in all new buildings in accordance with Section 510 of the International Fire Code.

Reason: The purpose of this proposal is simply to align the terminology in Section 510 with that being used by industry. The revisions shown simply go through and revise that term within IFC Section 510 and 1103.2 and IBC Section 918.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is to provide clarity on the proper terminology used for in buidling communication systems as used by industry. This proposal therefore will not have an impact on cost.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal appropriately aligns the terminology for in-building communication systems with that used by the industry. Note that IBC Section 918.1 was editorially revised to add the term "system" to state "In-building emergency responder communication enhancement system." (Vote: 14-0)

Final Hearing Results

F32-21	AS

F60-21 Part II

Original Proposal

IBC: 2603.9

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com); Tim Earl, GBH International, GBH International (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

2603.9 Special approval. Foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically approved based on one of the following large-scale tests. ~~such as, but not limited to~~,

1. NFPA 286 ~~(with~~ using the acceptance criteria of Section 803.1.1.1)
2. FM 4880
3. UL 1040
4. UL 1715

Such testing shall be ~~related to the actual end-use configuration and be~~ performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these ~~special~~ tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason: The revision to IFC Section 803.11 is for correlation with the approach taken by the companion IBC section, 803.4. IBC Section 803.4 simply references compliance with IBC Section 2603.9. However, IFC Section 803.11 (covers the same topic) currently includes additional text that partially duplicates text from IBC Section 2603.9. There is no reason for IFC Section 803.11 to partially duplicate IBC text when the section already specifically directs you to the IBC section, where the text is being pulled from.
Regarding the change to Section 2603.9, the current text "**such as, but not limited to**, NFPA 286 (with the acceptance criteria of Section 803.1.1.1), FM 4880, UL 1040 or UL 1715" and "such testing **shall be related to the actual end-use configuration** and be performed on the finished manufactured foam plastic assembly" creates an opportunity for "creative" compliance that I recently became aware of.
This "creative" solution is does not seem to meet the spirit of the codes' foam plastic regulations. So what is it?

I've learned that two testing laboratories are recognizing permissible use of exposed foam plastic based on a full-scale test that evaluates controlling a fire by oxygen depletion. From what I gather, the approach involves having a sealed attic and requiring a sealing cover over attic stair/hatch opening, perhaps with a sign requiring that the stairs be kept closed. In theory, with a limited oxygen supply in the space, any fire that starts in the space and involves exposed foam plastic (without a thermal barrier) would flash quickly, consume oxygen in the space and, at least temporarily, self-extinguish. While that might seem OK, the ability to maintain such spaces as airtight during the life of a structure certainly seems questionable, and do we really want to allow unprotected foam in these spaces under the philosophy of accepting almost instantaneous fire growth with the hope of self-extinguishment? I've seen exposed foam flashover a room corner test in less than 20 seconds, and relying on self-extinguishment by oxygen depletion doesn't seem like a sound strategy for fire safety for the life of a structure. Further, I wonder about the risk of a backdraft explosion when firefighters responding to the attic fire open the attic and introduce new oxygen into a well-insulated and previously superheated space. I also understand that there is an engineer's report that accompanies test reports for this approach that is being presented to jurisdictions to encourage approval of the approach.

When I contacted one of the laboratories reportedly conducting this test and asked for test documentation or a copy of the engineering report or engineer's letter, I was told that all of this is proprietary and could not be shared. Hence, I've prepared this proposal to bring this "loophole" (in my opinion) out in the open. I am hopeful that the testing labs and/or industry who are promoting the acceptability of this approach to fire safety for exposed foam plastic will show up at the code development hearing to provide sufficient technical justification, as perhaps there's something that's not yet come forward that should be considered. Lacking acceptable justification, it is my opinion that the enabling text in ICC codes should be deleted to close what I regard as a loophole in our approach to fire safety for foam plastics. It is important that the International Code prescribe reasonable and appropriate approval parameters for the use of foam plastics, because ICC Evaluation Service, who produce AC377 and ICC 1100 Standard for Spray-applied Polyurethane Foam Plastic Insulation, and other evaluation and testing companies are otherwise without limitation with respect to what they choose to develop as acceptable testing and approval parameters. If the code provides specific regulations, evaluation services and test labs will be obliged to follow the code, or at least explain variances in their approval criteria.

Furthermore, it is worth noting that, when this "loose" code text was added to legacy codes, standardized testing of foam plastics had not yet reached maturity. Today however, we have several recognized and standardized tests for this purpose, and continuing to maintain "loose" text in the code seems unjustified. If the oxygen depletion strategy is one that ICC might ultimately choose to recognize, then that strategy should become associated with a standardized test procedure that can be included in the code versus leaving the current loophole.

It is noted that similar text appears in Section 316.6 of the IRC, and it is my intent to process a correlating code proposal to the IRC in Group B.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not add any requirements but deletes a permitted approach for approval of foam plastic materials. There is the potential that materials that materials that had been approved based on non standard tests would have to be retested.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the four prescriptive paths in this section are already allowed using section 104.11. The committee sees no issue with allowing different tests and standards for Foam plastic, special approval. The four different prescriptive paths need to be considered individually. The committee also prefers to reference chapter 1, section 104.11, Alternative materials, design, and methods of construction and equipment.
One of the committee members mentioned unintended consequences. In some instances, AHJ's use this section for products that pass the prescriptive tests, but they think it was not the same as the application, and they use this section to require a full-scale test. (Vote: 13-0)

Final Hearing Results

F60-21 Part II AS

F62-21

Original Proposal

IFC: CHAPTER 9, SECTION 903, 903.1, 903.2; IBC: CHAPTER 9, SECTION 903, [F] 903.1, [F] 903.2

Proponents: Robert Davidson, Davidson Code Concepts, LLC, Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[F] 903.1 General. *Automatic sprinkler systems* shall comply with this section.

Revise as follows:

[F] 903.2 Where required. Approved *automatic sprinkler systems* in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12.

> **Exception:** Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, <u>batteries not required to have fire suppression by Section 1207 of the *International Fire Code* for energy storage systems</u> and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

Reason: This is a correlation fix.
The "batteries" reference is legacy language that goes back years, and since then the fire and building codes have had significant upgrades on specific requirements for batteries, i.e., energy storage systems.

The batteries referred to in the existing language were lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities which is a current exemption under Section 1207 of the fire code. The reason this correlation is necessary is because that exception is new and specific to the lead-acid technology, lithium-ion batteries for example would not have the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this simply correlates old language with the new requirements for energy storage systems, there is no impact on construction costs. It could save constructions costs by eliminating the confusion of having a project move forward without suppression that is required, then the increased costs to correct the error.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
903.2 Where required. *Approved automatic sprinkler systems* in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12.
Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have ~~fire suppression~~ <u>an automatic sprinkler system</u> by Section 1207 for energy

storage systems and standby engines, provided that those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the International Building Code or not less than 2-hour*horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both.

Committee Reason: The committee stated that the reason for the approval of the modification was that it clarifies the proper terminology to correlate with the requirement by replacing the words fire suppression with automatic sprinkler system. The reason for the approval of the proposal was stated to be that it clarifies that ESS should be in the exempt list for sprinklers. (Vote: 14-0)

Final Hearing Results

F62-21	AM

F66-21

Original Proposal

IFC: CHAPTER 9, SECTION 903, 903.1, 903.2.2 (New), 903.2.2, 903.2.2.2 (New), 903.2.4, 903.2.7, 903.2.7.3 (New), 903.2.9, 903.2.9.1; IBC: CHAPTER 9, SECTION 903, [F] 903.1, 903.2.2 (New), [F] 903.2.2, 903.2.2.2 (New), [F] 903.2.4, [F] 903.2.7, 903.2.7.3 (New), [F] 903.2.9, [F] 903.2.9.1

Proponents: Robert Davidson, Davidson Code Concepts, LLC, Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[F] 903.1 General. *Automatic sprinkler systems* shall comply with this section.

Revise as follows:

<u>903.2.2 Group B</u>. <u>An automatic sprinkler system shall be provided for Group B occupancies as follows</u>:

[F] <u>903.2.2.1</u> ~~903.2.2~~ Ambulatory care facilities. An *automatic sprinkler system* shall be installed throughout the entire floor containing an *ambulatory care facility* where either of the following conditions exist at any time:

1. Four or more care recipients are *incapable of self-preservation*.
2. One or more care recipients that are *incapable of self-preservation* are located at other than the *level of exit discharge* serving such a facility.

In buildings where ambulatory care is provided on levels other than the *level of exit discharge*, an *automatic sprinkler system* shall be installed throughout the entire floor as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest *level of exit discharge*, the *level of exit discharge*, and all floors below the level of *exit discharge*.

Exception: Floors classified as an *open parking garage* are not required to be sprinklered.

<u>903.2.2.2 Laboratories; testing, research and development</u>. <u>An automatic sprinkler system shall be installed throughout the fire areas utilized for the research and development or testing of lithium-ion or lithium metal batteries.</u>

[F] 903.2.4 Group F-1. An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).
4. <u>A Group F-1 occupancy used to manufacture lithium-ion or lithium metal batteries</u>.
5. <u>A Group F-1 occupancy used to manufacture vehicles, energy storage system or equipment containing lithium-ion or lithium metal batteries.</u>

[F] 903.2.7 Group M. An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m^2).

2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).

Revise as follows:

<u>**903.2.7.3 Lithium-ion or lithium metal battery storage.**</u> <u>An automatic sprinkler system shall be provided in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 322 or Chapter 32 of the International Fire Code.</u>

[F] 903.2.9 Group S-1. An *automatic sprinkler system* shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group S-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group S-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).
4. A Group S-1 *fire area* used for the storage of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m^2).
5. <u>A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).</u>

[F] 903.2.9.1 Repair garages. An *automatic sprinkler system* shall be provided throughout all buildings used as *repair garages* in accordance with Section 406, as shown:

1. Buildings having two or more *stories above grade plane*, including basements, with a *fire area* containing a *repair garage* exceeding 10,000 square feet (929 m^2).
2. Buildings not more than one *story above grade plane*, with a *fire area* containing a *repair garage* exceeding 12,000 square feet (1115 m^2).
3. Buildings with *repair garages* servicing vehicles parked in basements.
4. A Group S-1 *fire area* used for the repair of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m^2).
5. <u>A Group S-1 fire area used for the repair of vehicles powered by lithium-ion or lithium metal batteries that exceeds 500 square feet (46.4 m2).</u>

Reason: Over the last few cycles there have been a series of proposals dealing with energy storage systems that have highlighted the fire potential presented by lithium-ion and lithium metal batteries. Systems as small as 21 kWh would require the installation of an automatic sprinkler system. However, we have yet to fill in the blanks concerning these batteries in other occupancies and activities where there is a similar or greater potential for a fire event. This cycle there are additional topics covered by submittals such as battery collection and storage, personal mobility devices and emergency action plans.
To safely and effectively deal with the potential fire involving a thermal runaway involving a lithium-ion or lithium metal battery requires early detection, a mitigation plan and suppression. This proposal is to cover the suppression side of the equation.

903.2.2 is modified to cover Group B as a topic, the ambulatory care language is just renumbered.

903.2.2.2 is intended to capture testing, research and development activities where there can be an increased risk of thermal runaway and where in some cases it is intentional caused.

903.3.2.4 Item 4 captures the manufacture of the batteries; Item 5 captures the manufacture of vehicles, ESS and equipment where the battery is installed as part of the manufacturing process.

903.2.7.3 is a coordinating pointer where an M Group occupancy would require suppression based upon proposed Section 322 and currently by Chapter 32.

903.2.9 Item 5 captures the storage of battery powered vehicles. The 500 square foot correlates with the threshold above which Chapter 32 would require suppression for just lithium-ion battery storage.

903.2.9.1 Item 5 captures areas used to repair battery powered vehicles. The same 500 square foot threshold is used here.

Cost Impact: The code change proposal will increase the cost of construction
On a straight forward analysis this series of changes increases the cost construction. However, the majority of facilities involved in these activities do have suppression and any new construction of this nature includes suppression. Balanced against the cost of a fire that can not be extinguished routinely the installation of the suppression is ultimately a savings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that this is the added protection that's needed for lithium ion batteries and it covers all the occupancies where they could be used and stored including Group M occupancies. (Vote: 14-0)

Final Hearing Results

F66-21	AS

F67-21

Original Proposal

IFC: 903.2.8.3; IBC: [F] 903.2.8.3
Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Building Code

Delete without substitution:

~~**[F] 903.2.8.3 Group R-4, Condition 2.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4, Condition 2 occupancies.~~

Reason: These sections are unnecessary and are out of place. Group R4, Division 2 occupancies would default to NFPA 13R systems under Section 903.3.1.2, so there's no need to say that NFPA 13R systems are "permitted" in Section 903.2.8.3. Note that all of the subsections in 903.2.8 other than this one allow the use of NFPA 13D systems per Section 903.3.1.3. That is appropriate and necessary because this is the basis for getting some Group R occupancies out of NFPA 13R and into NFPA 13D. The Group R4, Division 2 provision is different in that it essentially "permits" what is otherwise already allowed. Although I am a consultant to NFSA, this proposal is submitted on my own behalf.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Editorial. This change does not impact application of the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the sections proposed for deletion are unnecessary to be repeated in the code since they are already covered in the code as stated in the proponent's reason statement. (Vote: 11-3)

Final Hearing Results

F67-21 AS

F70-21

Original Proposal

IFC: 903.3.1.1.1; IBC: [F] 903.3.1.1.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Building Code

Revise as follows:

[F] 903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from a room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

~~1. A room where the application of water, or flame and water, constitutes a serious life or fire hazard~~.

~~2.~~ 1. A room or space where sprinklers are considered undesirable because of the nature of the contentsand constitutes a serious life or fire hazard, where *approved* by the fire code official.

~~3.~~ 2. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a *fire-resistance rating* of not less than 2 hours.

~~4.~~ 3. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.

~~5.~~ 4. Fire service access elevator machine rooms and machinery spaces.

~~6.~~ 5. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008.

Reason: This is an editorial change to the omitted sprinkler locations. The first two locations were essentially the same locations and caused confusion among authorities having jurisdiction. This simplifies the section and clarifies the allowable omittable locations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is already a requirement and is an editorial clarification.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee stated that the reason for approval was that it eliminates redundant language but keeps the requirement. (Vote: 13-1)

Final Hearing Results

F70-21	AS

F71-21

Original Proposal

IFC: CHAPTER 9, SECTION 903, 903.1, 903.3.1.1, 903.3.1.1.3 (New); IBC: CHAPTER 9, SECTION 903, [F] 903.1, [F] 903.3.1.1, [F] 903.3.1.1.3 (New)

Proponents: Robert Davidson, Davidson Code Concepts, LLC, Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[F] 903.1 General. *Automatic sprinkler systems* shall comply with this section.

[F] 903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an *automatic sprinkler system* in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Sections 903.3.1.1.1 and 903.3.1.1.2.

Add new text as follows:

[F] 903.3.1.1.3 Lithium-ion or lithium metal batteries. Where sprinkler protection is required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based upon a series of fire tests conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

Reason: For the past few code cycles the IFC and IBC have been upgraded to address the potential fire event from lithium-ion and lithium metal batteries. This cycle there are additional proposals to cover battery storage, personal mobility devices, manufacturing and more. Automatic sprinkler systems are relied upon for fire protection. In the case of ESS the design of the sprinkler system is based upon a large scale fire testing at an approved laboratory because there was recognition that currently there is no guidance in NFPA 13. The same lack of guidance exists for any situation involving lithium-ion or lithium metal batteries. In the commodity classification portion of NFPA 13-2019 this issue is highlighted by "Table A.20.4(a) Examples of Commodities Not Addressed by Classifications in Section 20.4" which specifically lists lithium-ion and lithium metal batteries.
The recognition of the need for the submitted design to be based upon witnessed fire tests is missed by code officials as often as it is by designers and installers. The purpose of this new language is to provide important guidance to ensure that the submitted design is documented to be able to address the potential for a high heat release event.

Table A.20.4(a) Examples of Commodities Not Addressed by Classifications in Section 20.4

Ammunition Components
- Bulk primers and powder
Batteries
- Lithium and other similar exotic metals
- Lithium-ion and other rechargeable batteries that contain combustible electrolyte
Boat Storage
- Stored on racks
Boxes, Crates
- Empty, wood slatted*
Carpet Rolls
Combustible Metals — unless specifically identified otherwise
Compressed or Liquefied Flammable Gases (i.e., filled propane cylinders) — unless specifically identified otherwise
Explosives
- Blasting primers and similar items
Fertilizers (nitrates)
Fireworks
- Consumer and display
Flammable and Combustible Liquids — unless specifically identified otherwise
- Liquids that contain greater than 20 percent alcohol
Hanging Garments, Bulk Storage
Lighters (butane)
- Loose in large containers (Level 3 aerosol)
Storage Container
- Large container storage of household goods

*Should be treated as idle pallets.

Bibliography: NFPA 13-2019 "Table A.20.4(a) Examples of Commodities Not Addressed by Classifications in Section 20.4"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
In reality, this should be occurring now based upon the IFC/IBC use of NFPA 13 as the standard. In that case there would be no increase in cost. But for those designers, installers and property owners that were not aware of this issue there could be an increased cost for the necessary compliance.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2021 International Fire Code

903.3.1.1.3 Lithium-Ion or lithium metal batteries. Where ~~sprinkler protection is~~ automatic sprinkler systems are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based upon a series of fire tests conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

2021 International Building Code

[F] 903.3.1.1.3 Lithium-ion or lithium metal batteries. Where ~~sprinkler protection is~~ automatic sprinkler systems are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based upon a series of fire tests conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

Committee Reason: The committee stated that the reason for the approval of the modification was that it clarifies the intent by including the term automatic sprinkler systems. The stated reason for the approval of the proposal was that it adds the requirements for sprinkler protection needed for lithium batteries. (Vote: 14-0)

Final Hearing Results

F71-21 AM

F72-21

Original Proposal

IFC: 903.3.1.2; IBC: [F] 903.3.1.2

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association; Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org); Paula Cino, National Multifamily Housing Council, National Multifamily Housing Council (pcino@nmhc.org); Dan Buuck, National Association of Home Builders, National Association of Home Builders (dbuuck@nahb.org); Margo Thompson, Newport Ventures, National Multifamily Housing Council (mthompson@newportventures.net)

2021 International Building Code

Revise as follows:

[F] 903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. The floor level of the highest *story* is ~~30~~ 35 feet (~~9144~~10668 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest *story* is ~~30~~ 35 feet (~~9144~~10668 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Reason: During the previous code development cycle, an issue of significant concern was rectified with respect to NFPA 13R sprinklers in Group R occupancies in podium-style buildings and allowance for as many as four stories up to 60’ in height above grade to be constructed on top of the horizontal building separation. However, while continuing to allow for NFPA 13R systems in four story Group R occupancies, the height limit from fire department vehicle access to the floor level of the highest story was changed to only 30’. In most cases, this height limit will not allow for NFPA 13R sprinklers in a four-story apartment building.

According to feedback from contractors, developers, and design professionals, typical height of floor assembly framing in multifamily buildings is slightly less than twelve inches. A four-story apartment building with 8’-6” ceiling heights and the necessary 8” to 12” foundation exposure above grade, would exceed this 30’ limit. Likewise, a very common mixed use building type of three stories of residential occupancy above ground level retail space would also exceed the 30’ limit. The current 30’ limit is at the very low end of fourth-story floor level height and offers little flexibility for floor-to-ceiling heights greater than 8’-0”. With the current 30’ limitation, NFPA 13R sprinkler systems are essentially limited to three-story buildings: The NFPA 13R standard was specifically created to permit these systems in buildings up to four stories. This proposal will allow the use of NFPA 13R sprinkler systems as envisioned by the standard.

It is also important to understand that the floor level measurement is not taken from the grade adjacent to the building but from the lowest level of fire department vehicle access, which can be up to 150 feet away. The difference in elevation over that distance can be significant, further limiting the number of buildings which can meet this section. Below is an example of a 4-story multifamily building. The 4th floor is at a height of 32' above grade. However, the dimension used as the threshold for a 13R system increases where the lowest level of fire department vehicle access is below the level of grade at the building.

The dimension of 35’ was selected as the limit because it allows more flexibility for building design and floor-to-ceiling height while still remaining well within the 75’ reach of typical fire truck ladders. It is also significantly lower than the 60’ height limit which had been in place prior to the code change in 2021.

NFPA 13R systems have been extremely effective in protecting human lives as well as preventing significant property damage from fire in low-rise residential buildings since the NFPA 13R Standard was first published in 1989. A 2016 issue of the NFPA Journal published the findings of a workshop attended by subject matter experts that focused on the adequacy of 13R sprinklers. Overarching conclusions were 1) that major fires in 13R-protected buildings were the exception – not the rule and 2) that there was not sufficient evidence to indicate that 13R sprinklers have not been effective in protecting human life and reducing property damage. To quote the June 2016 NFPA Report describing the outcomes of the workshop:

- *“NFPA 13R/13D are effective standards that reduces loss of life and building damage due to a fire event.”*
- *“To consider or make any changes to NFPA 13R/13D, better (more refined) data needs to be identified as well as collected on a consistent basis. A national database that describes fire events with information on building type/codes would assist in making intelligent changes to any sprinkler standards.”*

Essentially limiting the use of NFPA 13R sprinkler systems to Group R buildings three-stories or less does not recognize other significant changes in the codes in recent cycles that offer increased fire protection. Furthermore, there may be some unintended consequences with respect to the current language. Recent cycles have seen changes such as sprinkler requirements for balconies in buildings where 13R sprinklers are used, increased attic protection if it is not sprinklered such as construction of the attic using fire retardant wood or non-combustible materials, and the recent 2021 requirement for special inspections of sealing fire penetrations and draft stopping. All of these ancillary provisions have increased fire protection and stringency of the fire code. Furthermore, by reducing the use of NFPA 13R systems in R-2 occupancies, requirements for sprinkler protection of balconies in these buildings have also been reduced – historically, an issue of significant concern. By extending requirements for NFPA 13 sprinklers in R-2 occupancies, sprinkler requirements for balconies are fewer or non-existent when compared to the absolute mandate of sprinklers on balconies for NFPA 13R systems through the IBC.

Census data reports that of the 13,000 multifamily buildings completed in 2019, more than 10,000 (77%) of these buildings were four stories or less. By reducing the percentage of multifamily buildings where NFPA 13R sprinklers are permitted, the code language as it currently stands will significantly impact housing affordability. The National Multifamily Housing Council estimates that moving from NFPA 13R to NFPA 13 sprinkler systems would carry an incremental installed cost increase of approximately $1.00/sq. ft. to $2.00/sq. ft. of overall building area on average across the US.

NFPA 13R sprinklers are a very effective means of assuring life safety and property protection in Group R buildings four stories and less while maintaining housing affordability. An increase in height to 35’ above or below the lowest level of fire department vehicle access is reasonable and modest and can easily be reached by the typical fire truck ladder.’ This proposal recognizes the long-standing effectiveness of 13R life safety systems, which have been allowed since the early years of the I-codes as well as the legacy codes.

Cost Impact: The code change proposal will decrease the cost of construction
Costs associated with requirements for attic protection in NFPA 13 systems not only includes the additional sprinklers and piping but also costs associated with increased hydraulic demand and water supply as well as necessary freeze protection in cold and even moderate climates. Greater density and spacing of sprinklers, larger pipe diameter, sprinklers in concealed spaces, and especially, requirements for attic protection (with some exceptions) all contribute to the added cost. This cost increase does not include the final cost with markup to the building owner or the potential need to add a fire pump in the NFPA 13 system. Moving from a 13R system to a 13 system for a $9,342,688, four-story, 48-unit apartment building increased construction costs by $102,255 or a little over $2,100/unit. (Home Innovation Research Labs, *Cost Analysis of Proposed Group A Code Changes (2018-2019 ICC Code Development Cycle)* – October 2018). This would have a substantial impact on both tenant rental rates and owner-occupied units. The detailed cost analysis is shown below.

Four-Story Building on Grade, 48 Units & Common Areas

[ELEVATION]

Table F117-A. Cost of NFPA 13 Sprinkler System Compared to NFPA 13R System

Component	Unit	Material	Labor	Total	w/O&P	Qty	Cost
Residential sprinkler heads	EA	16	21.50	37.5	53	292	15,476
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	4292	81,763
Wet standpipe riser, schedule 20, 4" diameter pipe	FL	5800	2875	--	8675	4	34,700
						Total NFPA 13R System	131,939
Additional sprinkler heads (attic)	EA	16	21.50	37.5	53	44	2,332
Additional sprinkler heads (non-exempt bathrooms)	EA	16	21.50	37.5	53	2	106
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	(4292)	(81,763)
1-1/2" CPVC piping (NFPA 13)	LF	18.55	9.75	28.3	36.50	4292	156,658
Additional 1-1/2" CPVC piping for new sprinkler heads (NFPA 13)	LF	18.55	9.75	28.3	36.50	618	22,557
Additional floor, wet standpipe riser, schedule 20, 4" diameter pipe	FL	1475	890	--	2365	1	2,365
						Total NFPA 13 System	234,194
						Total to Builder	102,255

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that during the last code cycle there was a very lengthy conversation and discussion regarding this requirement where it went to the floor and it went through the process and the members were able to speak. The past testimony about lowering it to 30 feet was regarding ladder access as most fire engines today per the NFPA standard carry 35-foot ladders which will reach 30 feet high and will reach a window. As noted, there is a need to stay at the current requirement until there is proof otherwise since it hasn't even been used yet. Additionally, there was concern about going lower below grade as it was brought up in the testimony and it was questioned why it's even being considered. (Vote: 9-5)

Public Comments

Public Comment 3

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above *grade plane*.
2. For other than Group R-2 occpancies, ~~T~~the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access. For Group R-2 occupancies, the roof assembly is less than 45 feet (13716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from *grade plane*.

2021 International Building Code

[F] 903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. For other than Group R2 occupancies, ~~T~~ the floor level of the highest *story* is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access. For Group R-2 occupancies, the roof assembly is less than 45 feet (13716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.
3. The floor level of the lowest *story* is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Commenter's Reason: When Proposal F117-18 was considered and approved last cycle, changing the limit for NFPA 13R systems to the current 30-foot value, the justification provided in the proponent's reason statement was entirely oriented towards addressing concerns with pedestal style buildings, and the chosen 30-foot threshold for triggering NFPA 13 protection was justified based on correlation with the trigger value for requiring standpipes. The logic offered was that standpipes require larger supply and riser piping, so the cost of upgrading to NFPA 13 protection would already be partially offset. While that's true, the piping cost offset versus the overall cost of increasing to NFPA 13 protection is insignificant. No specific life-safety or property protection basis or loss data justified the 30-foot threshold versus a few feet in either direction. Nevertheless, the approach of simply changing the current value to 35 feet doesn't address a bigger issue with the current provisions.

What was overlooked in selecting the current threshold is the common use of mezzanines in upper levels of Group R2 occupancies. From the exterior, a mezzanine level in the 4th story would appear to be a 5th story, and such mezzanines often include a sleeping area. Yet, the current threshold would allow a NFPA 13R system to be used if the floor level of the 4th floor does not exceed the 30-foot limit. Meanwhile, a building not having mezzanine levels with a slightly higher 4th floor level, perhaps due to a slightly sloping lot and a lower fire-department access road, would be forced into using NFPA 13. The requirement to use a higher level of fire protection for a lesser risk condition makes no sense and is not justified.

This public comment offers a different approach modeled after what has already been approved by the ICC membership to address attic protection in NFPA 13R buildings in Section 903.3.1.2.3 in the 2018 edition. The approach triggers NFPA 13 protection based on the height of the attic, set at a threshold of 45 feet to reasonably allow a typical 4-story apartment building with 9-foot ceilings and 1-foot floor ceiling assemblies. The additional 5 feet accommodates the height of a grade-level slab and downward slope away from a building on a nearly-flat lot to accommodate drainage in the distance between the building and a fire access road, from which the lowest level of fire department vehicle access is measured.

In summary, this public comment will close the loophole that currently exists in the text that was added to the code in the 2021 edition, permitting a 13R protected building to have a 55-foot attic height with a tall 4th floor mezzanine without attic protection as long as the floor level of the highest occupied floor isn't over 30 feet above the lowest level of fire department vehicle access. In approving this proposal, the code will still strictly limit the permissible use of NFPA 13R to R2 occupancies that don't exceed 4 stories and which cannot include a combination of tall ceilings and upper level mezzanines. The proposal has been limited to R2 occupancies recognizing the different operational, occupant and architectural attributes of R2 vs. R1 occupancies.

Although I am a consultant to NFSA and NFSA supported the original proposal, this public comment is my own, based on having been involved in developing ICC's fire protection requirements for multifamily buildings for over 20 years, and it is not submitted on NFSA's behalf.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal cannot be specifically tied to increasing or decreasing the cost of construction, as its application is dependent on architectural choices that may or may not lead to a change in cost vs. the cost of compliance with the 2021 edition. In some cases, such as tall buildings with mezzanines, a cost increase could be experienced. In other cases, a cost reduction could be experienced, the proposal may have no impact on cost.

Final Hearing Results

F72-21	AMPC3

F73-21

Original Proposal

IFC: 903.4.2; IBC: [F] 903.4.2

Proponents: Chase Browning, Medford Fire Department, Medford Fire Department

2021 International Building Code

Revise as follows:

[F] 903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2,~~A~~an approved audible device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Reason: It is appropriate to provide an audible alarm for NFPA 13 and NFPA 13R systems, however, NFPA 13D (903.3.1.3) does not require such a device.

Cost Impact: The code change proposal will decrease the cost of construction
Not including the exterior bell will reduce costs.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that an exception already exists in the section charging text and all the other sections are subsections to that charging text. Additionally, it was noted that NFPA 13D systems are allowed for some structures that are not single family dwellings, which could be historic resources, and not having a bell that is going to tell you that there's a water flow going on inside is potentially going to damage those structures beyond repair. (Vote: 8-7)

Public Comments

Public Comment 1

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com); Chase Browning, Medford Fire Department, Medford Fire Department requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.4 Sprinkler system supervision and alarms . *Automatic sprinkler system* supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

~~**903.4**~~ **903.4.1 Electronic supervision** ~~**Sprinkler system supervision and alarms**~~ **.** Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

~~903.4.1~~ 903.4.2 Monitoring . Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the *fire code official*, shall sound an audible signal at a constantly attended location.

~~**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.~~

~~903.4.2~~ 903.4.3 Alarms . An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a water flow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided ~~installed~~, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Exception: *Automatic sprinkler systems* protecting one- and two-family dwellings.

903.3.9 ~~903.4.3~~ High-rise building floor ~~Floor~~ control valves . *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

2021 International Building Code

903.4 Sprinkler system supervision and alarms.

Automatic sprinkler system supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

[F] ~~903.4~~ 903.4,1 Electronic supervision ~~Sprinkler system supervision and alarms~~ . Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures, and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.

2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

[F] ~~903.4.1~~ 903.4.2 Monitoring . Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the fire code official, shall sound an audible signal at a *constantly attended location*.

~~**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.~~

[F] ~~903.4.2~~ 903.4,3 Alarms . An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a water flow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided ~~installed~~, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Exception: *Automatic sprinkler systems* protecting one- and two-family dwellings.

[F] ~~903.4.3~~ 903.3.9 High-rise building floor ~~Floor~~ control valves . *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

Commenter's Reason: Discussion at the committee hearing and the 8:7 vote clearly demonstrated varying interpretations of how Section 903.4 should be applied and that the section needs a more comprehensive rewrite to fix the existing issues. This public comment does the following to address all points of concern:

1. Creates a scoping section. Some interpret the existing exceptions in 903.4 as applying to the subsections under Section 903.4, while others do not. The revision clarifies scoping and that the exceptions in 903.4 of the 2021 edition only apply to that section, and not the subsections that followed.
2. Moves/merges the exception currently under 903.4.1 (monitoring) into the retitled section above (electronic supervision). The exception primarily relates to the need for electronic supervision, not monitoring by a supervising station or constantly attended location. Thereby, it was misplaced. Further, the current exception #2 in 903.4 exempted ALL limited area systems from any electronic supervision, so one could have argued that the exception under "monitoring" never applied. Merging the exceptions fixes that conflict in a way that clarifies logical application of the current code provisions.
3. Incorporates the committee recommendation on F74 but with improved text vs. the floor amendment that was accepted by the committee. The intent of F74 is to add visual alarm devices where audible devices are currently required. As modified by the committee, F74 also clarified that water flow switches required to be electrically supervised have to be be powered by a fire alarm control unit or a fire alarm system. If this public comment is approved, it is intended to replace the committee action on F74 since this will be the last action on this section in the 2024 edition cycle.
4. Section 903.4.3 is being relocated to Section 903.3 (installation). The requirement is more appropriately co-located with installation provisions because it is requiring floor control valves.
5. The original F73 proposed exception for one- and two-family dwellings is being added to Section 903.4.3. There was general

agreement at the hearing that one- and two-family dwellings should not require exterior water flow alarms, but some felt that the original proposal was unnecessary (per the scoping misinterpretation issue discussed in #1 above). Others did not support extending an outdoor water flow alarm exception to all 13D installations, as originally proposed, so this public comment only applies the exception to one- and two-family dwellings.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
Outside alarm will now clearly not be required for one- and two-family dwelling sprinkler systems. Remainder of the proposal is cleanup of existing text and new provisions added by F74.

Final Hearing Results

F73-21	AMPC1

F75-21 Part I

Original Proposal

PART I IFC: 315.3.1, TABLE 903.2.5.2, 903.3.1, 903.4, [BE] TABLE 1006.2.1, [BE] TABLE 1017.2, [BE]TABLE 1020.2, 1103.4.1, 1103.5.4, 2703.10.4.4.1, 3204.2, 3206.10.1.1, 3303.3, 3501.3, TABLE 5104.3.2, E103.1.5, 903.5; IBC: 410.5.3.2, [F] 415.11.12.3, 901.4, [F] 903.2.5.2, TABLE 903.2.5.2, TABLE 903.2.11.6, [F] 903.3.1, [F] 903.5, [F] 909.6.1, TABLE 1006.2.1, TABLE 1017.2, 3007.2.2, [BF] 1705.15

PART II IRC: P2904.1, P2904.3.4, P2904.4.2, P2904.7, P2904.8.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE PLUMBING AND MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

410.5.3.2 Exit access travel distance. The *exit access* travel distance shall be not greater than 300 feet (91 440 mm) for buildings without an automatic sprinkler system and 400 feet (122 mm) for buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

[F] 415.11.12.3 Automatic sprinkler locations. Automatic sprinklers ~~systems~~ shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical ducts, sprinklers shall be installed at the top and at alternate floor levels.

901.4 Threads. Threads provided for fire department connections to *automatic sprinkler systems*, standpipes, yard hydrants or any other fire hose connection shall be compatible with the connections used by the local fire department.

[F] 903.2.5.2 Group H-5 occupancies. An *automatic sprinkler system* shall be installed throughout buildings containing Group H-5 occupancies. The design of the automatic sprinkler system shall be not less than that required by this code for the occupancy hazard classifications in accordance with Table 903.2.5.2.
Where the design area of the automatic sprinkler system consists of a *corridor* protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

TABLE 903.2.5.2 GROUP H-5 AUTOMATIC SPRINKLER SYSTEM DESIGN CRITERIA

LOCATION	OCCUPANCY HAZARD CLASSIFICATION
Fabrication areas	Ordinary Hazard Group 2
Service corridors	Ordinary Hazard Group 2
Storage rooms without dispensing	Ordinary Hazard Group 2
Storage rooms with dispensing	Extra Hazard Group 2
Corridors	Ordinary Hazard Group 2

TABLE 903.2.11.6 ADDITIONAL REQUIRED PROTECTION SYSTEMS

SECTION	SUBJECT
402.5, 402.6.2	Covered and open mall buildings
403.3	High-rise buildings

404.3	Atriums
405.3	Underground structures
407.7	Group I-2
410.6	Stages
411.3	Special amusement buildings
412.2.4	Airport traffic control towers
412.3.6, 412.3.6.1, 412.5.6	Aircraft hangars
415.11.11	Group H-5 HPM exhaust ducts
416.5	Flammable finishes
417.4	Drying rooms
424.3	Play structures
428	Buildings containing laboratory suites
507	Unlimited area buildings
508.5.7	Live/work units
509.4	Incidental uses
1030.6.2.3	*Smoke-protected assembly seating*
IFC	*Automatic sprinkler system* requirements as set forth in Section 903.2.11.6 of the *International Fire Code*

[F] 903.3.1 Standards. Automatic s~~S~~prinkler systems shall be designed and installed in accordance with Section 903.3.1.1 unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

[F] 903.5 Testing and maintenance. Automatic s~~S~~prinkler systems shall be inspected, tested, and maintained in accordance with the *International Fire Code*.

[F] 909.6.1 Minimum pressure difference. The pressure difference across a *smoke barrier* used to separate smoke zones shall be not less than 0.05-inch water gage (0.0124 kPa) in ~~fully sprinklered~~ buildings equipped throughout with automatic sprinkler systems.
In buildings permitted to ~~be other than fully sprinklered~~not to be equipped throughout with automatic sprinkler systems, the smoke control system shall be designed to achieve pressure differences not less than two times the maximum calculated pressure difference produced by the design fire.

TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Automatic Sprinkler System (feet)		With Automatic Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[d], I-4	10	NP	NP	75[a]
I-3	10	NP	NP	100[a]
R-1	10	NP	NP	75[a]
R-2	20	NP	NP	125[a]
R-3[e]	20	NP	NP	125[a, g]
R-4[e]	20	NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having *fixed seating*, see Section 1030.8.

d. For the travel distance limitations in Group I-2, see Section 407.4.

e. The *common path of egress travel* distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.

f. The length of *common path of egress travel* distance in a Group S-2 *open parking garage* shall be not more than 100 feet.

g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200[e]	250[b]
I-1	Not Permitted	250[b]
B	200	300[c]
F-2, S-2, U	300	400[c]
H-1	Not Permitted	75[d]
H-2	Not Permitted	100[d]
H-3	Not Permitted	150[d]
H-4	Not Permitted	175[d]
H-5	Not Permitted	200[c]
I-2, I-3	Not Permitted	200[c]
I-4	150	200[c]

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:

- Section 402.8 : For the distance limitation in malls
- Section 407.4: For the distance limitation in Group I-2.
- Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
- Section 411.2: For the distance limitation in special amusement areas.
- Section 412.6: For the distance limitations in aircraft manufacturing facilities.
- Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
- Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
- Section 1006.3.4: For buildings with one exit.
- Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
- Section 1030.7: For increased limitation in assembly seating.
- Section 3103.4: For temporary structures.
- Section 3104.9: For pedestrian walkways.

3007.2.2 Automatic Sprinkler system monitoring. The automatic sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's *fire alarm system*.

[BF] 1705.15 Sprayed fire-resistant materials. *Special inspections* and tests of sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6. *Special inspections* shall be based on the fire-resistance design as designated in the *approved construction documents*. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed during construction with an additional visual inspection after the rough installation of electrical, *automatic sprinkler systems*, mechanical and plumbing systems and suspension systems for ceilings, and before concealment where applicable. The required sample size shall not exceed 110 percent of that specified by the referenced standards in Sections 1705.15.4.1 through 1705.15.4.9.

Reason: Across the I codes there are varying ways to describe an automatic sprinkler system. his proposal correlates several of the I codes to use the defined term of automatic sprinkler system. This allows for a better understanding of the term and application. Other proposals have been submitted to make several sprinkler and fire protection correlations and improvements.
Each section noted in this proposal has been changed to clarify what type of system is installed. In many cases, it is a simple deletion of the word "fire" or an added "automatic" and changes are to refer to the italicized term of automatic sprinkler system as is defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are not technical changes in this proposal. It is for term correlation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal updates the terminology for automatic sprinkler systems. (Vote: 14-0)

Final Hearing Results

F75-21 Part I AS

F76-21

Original Proposal

IFC: 904.12 (New), NFPA Chapter 80 (New); IBC: [F] 904.12 (New), NFPA Chapter 35 (New)

Proponents: Kevin Kelly, Victaulic, Victaulic (kevin.kelly@victaulic.com)

2021 International Building Code

Add new text as follows:

[F] 904.12 Hybrid Systems. Hybrid Fire Extinguishing Systems shall be installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 770-2021 Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

Reason: NFPA 770 is a new NFPA standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems. This new standard should be added to the list of Alternative Automatic Fire-Extinguishing Systems that could potentially be used for fire protection. NFPA 770 should also be added to the referenced document section.

Bibliography: NFPA 770, Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems, 2021 Edition

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change should not increase cost. It adds a new standard to the list of Alternative Automatic Fire-Extinguishing Systems that could potentially be used for fire protection.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2021 International Fire Code

904.12 Hybrid Fire Extinguishing Systems. Hybrid Fire Extinguishing Systems shall be designed, installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

2021 International Building Code

[F] 904.12 Hybrid Fire Extinguishing Systems. Hybrid Fire Extinguishing Systems shall be designed, installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

2021 International Fire Code

Add new definition as follows:

HYBRID FIRE EXTINGUISHING SYSTEM. A system which utilizes a combination of atomized water and inert gas to extinguish fire.

Committee Reason: The committee stated that the reason for the approval of the proposal with the modification was that it is an important addition to fire suppression systems with hybrid systems and it is expected to see expanded use and it provides a means to put it in the code and move forward along with the reason statement. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Kevin Kelly, Victaulic, Victaulic (kevin.kelly@victaulic.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

HYBRID FIRE EXTINGUISHING SYSTEM . A system which utilizes a combination of atomized water and inert gas to extinguish fire.

Commenter's Reason: Add a definition of Hybrid Fire Extinguishing Systems to the IBC to be consistent with the IFC. NFPA 770, Standard on Hybrid (Water and Inert gas) Fire Extinguishing Systems, was added to Chapter 904 of both the IFC and the IBC. A definition of Hybrid Fire Extinguishing Systems was only added to the IFC and the definition should have also been added to the IBC.

Bibliography: NFPA 770, Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Adding a definition of Hybrid Fire Extinguishing Systems will not increase or decrease the cost of construction.

Final Hearing Results

F76-21	AMPC1

F77-21

Original Proposal

IFC: 904.13.1; IBC: [F] 904.13.1
Proponents: Stephen DiGiovanni, Clark County, Self (sdigiovanni@clarkcountynv.gov)

2021 International Building Code

Revise as follows:

[F] 904.13.1 Manual system operation. A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) or less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exceptions:
1. *Automatic sprinkler systems* shall not be required to be equipped with manual actuation means2. . Where locating the manual actuation device between 10 feet (3048 mm) to 20 feet (6096 mm) from the cooking area is not feasible, the fire code official is permitted to accept a location at or near a means of egress from the cooking area, where the manual actuation device is unobstructed and in view from the means of egress.

Reason: The purpose of this proposal is to allow the fire code official to accept a location for the manual actuation device for the suppression system of commercial cooking appliances at a location that may be closer or further than the 10 feet to 20 feet range currently prescribed in the code. During recent reviews of large A-4 and A-5 facilities, it was apparent that strict conformance of these distances could not be readily achieved. In some instances, the cooking appliance is a self-contained device that is mobile and can be rolled around to various locations of a concourse. There appliances have built-in suppression systems, and the manual actuation device is mounted on the appliance. In other instances, the kitchens are so large that there is no available wall space within 20 feet of the cooking area for the mounting of the actuation device.
It is useful to look at other code provisions that address protection for cooking appliances. First, there is an allowance for Class K extinguishers to be placed up to 30 feet from commercial cooking equipment (Section 906). It would be reasonable to assume that colocation of the Class K extinguisher with the manual actuation device of automatic suppression may be advantageous. Second, the 2017 edition of NFPA 96 was changed to entirely remove the distance range of 10 ft to 20 ft. Instead, the 2021 edition of NFPA 96, Section 10.5.1.1, reads as follows: "At least one manual actuation device shall be located in a means of egress or at a location acceptable to the authority having jurisdiction".

The intent of this proposal is to maintain the 10 feet to 20 feet range in the main code section, as this provides initial guidance to both the code user and the AHJ as to an acceptable location for installation of the manual actuation device, and provides good consistency with the many existing installations. As an AHJ, it is very useful to have the code provide that initial guidance, rather than entirely eliminating that guidance from the text. While there may be good justification to change the 20 feet limit to an upper limit of 30 feet to correlate with the location of the Class K extinguisher, this proposal does not include that change, and only references that difference to justify the potential fo longer distance to the manual actuation device. The proposal is offered as an added exception, so that only where locating the device in the currently prescribed 10 feet to 20 feet range is not feasible, can a location outside of that range be accepted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change the required equipment that needs to be provided, so component and installation costs are expected to be essentially the same. There may be a cost benefit associated with a more lenient approach prescribing the location of the manual actuation device, however those savings are difficult to predict and thus are not relied on as justification for this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that maintaining the current requirement provides good guidance and the exception provides a jurisdiction the authority to accept alternate locations based on the individual unique situation. (Vote: 13-1)

Final Hearing Results

F77-21 AS

F78-21

Original Proposal

IFC: 905.3; IBC: [F] 905.3
Proponents: Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Building Code

Revise as follows:

[F] 905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.8. Standpipe systems are allowed to be combined with *automatic sprinkler systems*.

~~Exception~~ Exceptions:

1. Standpipe systems are not required in Group R-3 occupancies.
2. Standpipe systems are not required in Group R-2 townhouses.

Reason: This proposal doesn't technically change the code, recognizing that there are no locations in a townhouse that would require hose connections in accordance with Sections 905.4, 905.5, or 905.6. Regardless of whether a standpipe is technically required by Section 905.3, you would not install such a system if hose connections are never required. Clearly, it is not the intent of the code to require standpipes in individual townhouse units, but there are cases where townhouses might exceed the story or height thresholds in Section 905.3.1, which introduces a conflict. This proposal fixes that issue and brings clarity to the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal doesn't change how the code applies and is intended to simply bring clarity to the existing requirements. Accordingly, there is no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated the reason for approval was that it makes sense not providing the standpipe hose connections in a townhouse as there is no practical place to provide them and this clarifies that standpipes are not required for tall townhouses. (Vote: 13-1)

Final Hearing Results

F78-21	AS

F81-21

Original Proposal

IFC: 905.4; IBC: [F] 905.4
Proponents: Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Building Code

Revise as follows:

[F] 905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway* <u>or *exterior exit stairway*</u>, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a *horizontal exit*.

   Exception: Where floor areas adjacent to a *horizontal exit* are reachable from an *interior exit stairway* <u>or *exterior exit stairway*</u> hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the *horizontal exit*.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* <u>or *exterior exit stairway*</u> hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit *passageway* or exit *corridor* to the mall. In *open mall buildings*, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit *passageway* or *exit* corridor to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

Reason: This proposal corrects an error that first appeared in the 2015 IFC. Proposal E2-12, submitted by ICC-CTC, went through the codes to separate "exit stairway" references into either "interior exit stairway" or "exterior exit stairway" wherever the term appeared. Unfortunately, the revision to Section 905.4, Item 1 mistakenly added "interior" but not "exterior." This resulted in an unintended and unjustified technical change; whereby, Class I hose connection locations were no longer specified for exterior exit stairways, even if a building exceeds the height thresholds requiring installation of a standpipe system. Although tall buildings don't often have exterior exit stairways, they sometimes do, and the code needs to be fixed to address these instances.

Cost Impact: The code change proposal will increase the cost of construction
From a literal perspective, this proposal might be viewed as increasing the cost of construction in that it technically adds a requirement for additional hose connections in buildings with exterior exit stairways and which require standpipes. However, the change to the 2015 edition that eliminated this requirement was done in error, with no disclosure or substantiation. The intent is to return the code to where it should have been all along.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The reason for approval was based on the proponent's reason statement. (Vote: 14-0)

Final Hearing Results

F81-21	AS

F83-21

Original Proposal

IFC: 905.5.1; IBC: [F] 905.5.1

Proponents: William Conner, American Society of Theatre Consultants, American Society of Theatre Consultants (bill@bcaworld.com)

2021 International Building Code

Revise as follows:

[F] 905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with occupant loads of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, and on each side of the balcony ~~and on each tier of dressing rooms~~.

Reason: Delete “each tier of dressing rooms” because the arrangement of dressing rooms in tiers at the sides of the stage was abandoned before World War II.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change - just deleting archaic requirement.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee stated that the reason for approval was that it recognizes that the designs in this requirement are not currently used, outdated and should not be required. (Vote: 13-1)

Final Hearing Results

F83-21	AS

F85-21

Original Proposal

IFC: TABLE 906.1; IBC: TABLE 906.1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] TABLE 906.1 ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS IN THE INTERNATIONAL FIRE CODE

IFC SECTION	SUBJECT
303.5	Asphalt kettles
307.5	Open burning
308.1.3	Open flames–torches
309.4	Powered industrial trucks
1204.10	Portable Generators
2005.2	Aircraft towing vehicles
2005.3	Aircraft welding apparatus
2005.4	Aircraft fuel-servicing tank vehicles
2005.5	Aircraft hydrant fuel-servicing vehicles
2005.6	Aircraft fuel-dispensing stations
2007.7	Heliports and helistops
2108.4	Dry cleaning plants
2305.5	Motor fuel-dispensing facilities
2310.6.4	Marine motor fuel-dispensing facilities
2311.6	Repair garages
2404.4.1	Spray-finishing operations
2405.4.2	Dip-tank operations
2406.4.2	Powder-coating areas
2804.3	Lumberyards/woodworking facilities
2808.8	Recycling facilities
2809.5	Exterior lumber storage
2903.5	Organic-coating areas
3006.3	Industrial ovens
3107.9	Tents and membrane structures
3206.10	High-piled storage
3315.1	Buildings under construction or demolition
3318.3	Roofing operations
3408.2	Tire rebuilding/storage
3504.2.6	Welding and other hot work
3604.4	Marinas
3703.6	Combustible fibers
5703.2.1	Flammable and combustible liquids, general
5704.3.3.1	Indoor storage of flammable and combustible liquids
5704.3.7.5.2	Liquid storage rooms for flammable and combustible liquids
5705.4.9	Solvent distillation units
5706.2.7	Farms and construction sites–flammable and combustible liquids storage
5706.4.10.1	Bulk plants and terminals for flammable and combustible liquids
5706.5.4.5	Commercial, industrial, governmental or manufacturing establishments–fuel dispensing
5706.6.4	Tank vehicles for flammable and combustible liquids
5707.5.4	On-demand mobile fueling
5906.5.7	Flammable solids
6108.2	LP-gas

Reason: This proposal introduces a missing reference to a portable extinguisher requirement for on-demand mobile fueling.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted

on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely inserts a missing cross reference.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal adds a missing cross reference. (Vote: 14-0)

Final Hearing Results

F85-21	AS

F86-21

Original Proposal

IFC: 907.2.1; IBC: [F] 907.2.1

Proponents: Deborah Ohler, P.E., Ohio Board of Building Standards, Ohio Board of Building Standards, Staff Engineer (dohler@com.state.oh.us)

2021 International Building Code

Revise as follows:

[F] 907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A*occupant load* is more than 100 persons above or below the*lowest level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an*automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.
2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load of greater than or equal to 300 and less than 15,000 occupants provided all of the following are met:
   - 2.1. A public address system with standby power is provided;
   - 2.2. Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less;
   - 2.3. Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;
   - 2.4. All means of egress from the bleacher-type seating are open to the outside.
3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:
   - 3.1. There are no enclosed spaces under or attached to the outdoor bleacher-type seating;
   - 3.2. The bleacher-type seating is erected for a period of less than 180 days; and
   - 3.3. Evacuation of the bleacher-type seating is included in an approved fire safety plan.

Reason: According to the IBC Section 303.6, outdoor bleacher-type seating is classified as Group A-5. Although not a typical building with walls and ceilings easily allowing for the installation of manual fire alarm boxes and occupant notification appliances, the outdoor bleacher-type seating structure, as a Group A-5 classification, results in a requirement for a manual fire alarm system with occupant notification appliances when the occupant load is 300 or more. According to Section 907.2.1.1, when the occupant load is 1000 or more, this triggers the initiation of an emergency voice/alarm communication system instead of the typical horn/strobe alarm notification appliances used for occupant notification.

The IBC Section 907.4.2 requirements for manual fire alarm boxes do not fit very well when trying to apply the requirements to outdoor bleacher-type seating. For example, let's consider a typical high school football or track field with outdoor bleacher-type seating. According to the code, the manual fire alarm box shall be located not more than 5 feet from the entrance to each exit. In this case, where is the exit and where should the boxes be mounted. Additional structures would likely need to be constructed in order to mount the manual fire alarm boxes and they would need to be weather-resistant and tamper-proof. A similar problem occurs when trying to apply the IBC Section 907.5.2 code requirements for the occupant notification devices (audible and visual alarm notification appliances). The ambient noise level at a football game could possibly far exceed 105 dBA. If this happens, the OBC Section 907.5.2.1.2 would allow the elimination of the audible alarm notification appliances provided that visible alarm notification appliances are installed. Where should the visible notification devices be mounted so that those sitting in the bleachers could see them without having to create additional mounting structures that may block the view? Given that the events are outside and sometimes occur during the daylight, it would be possible that the visible notification appliances may not even be effective at alerting those in attendance. It seems to be a huge expense, without much guaranteed benefit, especially for small outdoor bleacher-type seating structures.

After discussing this with several architects and code officials, I discovered a lot of inconsistency in the design and enforcement of this requirement for a manual fire alarm system and notification appliances for bleachers. Many designers are not providing the system and many code officials are approving the structure without the fire alarm system.

After researching the NFPA standards 101 (Life Safety Code), 102 (Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures), and 5000 (Building Construction and Safety Code), I discovered that the requirement for a fire alarm system seems to be consistent. However, the NFPA standards offer an exception that allows an alternative to the visible alarm signals such as using the scoreboard, message board, or other electronic device as a notification means. There is no such exception in the IBC.

It wasn't until after reviewing the code forum blogs that I thought to look at the ICC standard 300 which is referenced from the IBC Chapter 10, Section 1030. Section 309.1 of the ICC 300 standard offers a few exceptions to the emergency voice/alarm communication systems. I fail to understand why this exception is hidden in the standard which is referenced only from the IBC means of egress chapter and it is not clear whether the exception was also intended to apply to the manual fire alarm system with notification appliances. I contacted the proponent of the ICC 300 Section 309.1, Gene Boecker, and the author of the public comment, Greg Nicholls, to get their input regarding the intent. Both told me that they believe the exception in the ICC 300 standard is intended to exempt the required fire alarm systems from the outdoor bleacher-type seating structures in addition to exempting the emergency voice/alarm communication system.

Therefore, I am proposing to bring the ICC 300 exceptions into the fire protection system chapter of the IBC and the IFC where it is more appropriately located and more likely to be seen. I have also proposed a few modifications to the ICC 300 exceptions to remove the subjectivity and add clarity.

Bibliography: 1. ICC 300 Standard on Bleachers, Folding and Telescopic Seating and Grandstands; 2017 edition, International Code Council (ICC), Washington, DC; Section 309.1
2. NFPA 101 Life Safety Code, 2021 edition, National Fire Protection Association (NFPA), Quincy, MA, Sections 9.6 and 12.3.4

3. NFPA 102 Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2016 edition; National Fire Protection Association (NFPA); Quincy, MA; Section 9.6.3.5

4. NFPA 5000 Building Construction Safety Code; 2021 edition; National Fire Protection Association (NFPA); Quincy, MA; Sections 16.3.4, 16.4.9, 32.7, and 55.2

Cost Impact: The code change proposal will decrease the cost of construction
This proposal is intended to bring into the IBC and the IFC a few exceptions for fire alarm systems and emergency voice alarm communication systems. These exceptions are buried in a standard that is not referenced from Chapter 9 of the IBC or the IFC. As a result, designers and code officials may not be aware that the exception already exists.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reasons for approval were that it addresses a situation not previously anticipated for Group A-5 occupancies, includes information contained in ICC 300 that has not previously been introduced and it adds reasonable exemptions for manual fire alarm boxes serving a Group A-5 outdoor bleacher type seating. Additionally, it was noted that is does not burden the end user with buying another standard when it could easily be put into the body of the code and it is probably already being done. (Vote: 9-5)

Final Hearing Results

F86-21	AS

F88-21

Original Proposal

IFC: CHAPTER 9, SECTION 907, 907.1, 907.2.2, 907.2.2.2 (New), 907.2.4, 907.2.4.1 (New), 907.2.7 (New), 907.2.7, 907.2.7.1, 907.2.7.2 (New), 907.2.10 (New), 907.2.10, 907.2.10.2 (New); IBC: CHAPTER 9, SECTION 907, [F] 907.1, [F] 907.2.2, [F] 907.2.2.2 (New), [F] 907.2.4 , [F] 907.2.4.1 (New), [F] 907.2.7 (New), [F] 907.2.7, [F] 907.2.7.1, [F] 907.2.7.2 (New), [F] 907.2.10 (New), [F] 907.2.10, [F] 907.2.10.2 (New)

Proponents: Robert Davidson, Davidson Code Concepts, LLC, Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 907
FIRE ALARM AND DETECTION SYSTEMS

[F] 907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components.

[F] 907.2.2 Group B. A manual fire alarm system, which activates the occupant notification system in accordance with Section 907.5, shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B *occupant load* of all floors is 500 or more.
2. The Group B *occupant load* is more than 100 persons above or below the lowest*level of exit discharge*.
3. The *fire area* contains an *ambulatory care facility*.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Add new text as follows:

<u>**[F] 907.2.2.2 Laboratories; research and development or testing.** A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area utilized for the research and development or testing of lithium-ion or lithium metal batteries.</u>

[F] 907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more *stories* in height.
2. The Group F occupancy has a combined *occupant load* of 500 or more above or below the lowest*level of exit discharge*.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Add new text as follows:

<u>**[F] 907.2.4.1 Manufacturing involving, lithium-ion or lithium metal batteries.** A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area where lithium-ion or lithium metal batteries are manufactured; and where the manufacturer of vehicles, energy storage systems or equipment containing lithium-</u>

<u>ion or lithium metal batteries when the batteries are installed as part of the manufacturing process.</u>

<u>[F] 907.2.7 Group M</u>. <u>A fire alarm system shall be in a Group M occupancy as required by the following sections</u>:

Revise as follows:

[F] <u>907.2.7.1</u> ~~907.2.7 Group M~~ <u>Occupant load</u>. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group M occupancies where one of the following conditions exists:

1. The combined Group M *occupant load* of all floors is 500 or more persons.
2. The Group M *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*.

Exceptions:

1. A manual fire alarm system is not required in *covered or open mall buildings* complying with Section 402.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

[F] <u>907.2.7.1.1</u> ~~907.2.7.1~~ Occupant notification. During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a waterflow switch shall not be required to activate the alarm notification appliances when an *alarm signal* is activated at a *constantly attended location* from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

Add new text as follows:

<u>[F] 907.2.7.2 Storage of lithium-ion or lithium metal batteries</u>. <u>A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 321.</u>

<u>[F] 907.2.10 Group S</u>. <u>A fire alarm system shall be in a Group S occupancy as required by the following sections</u>:

Revise as follows:

[F] <u>907.2.10.1</u> ~~907.2.10 Group S~~ <u>Public- and self-storage occupancies</u>. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S public- and self-storage occupancies three stories or greater in height for interior corridors and interior common areas. Visible notification appliances are not required within storage units.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Add new text as follows:

<u>[F] 907.2.10.2 Storage of lithium-ion or lithium metal batteries</u>. <u>A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area where required for the storage of lithium-ion batteries or lithium metal batteries By Section 321of the International Fire Code.</u>

Reason: Over the last few cycles there have been a series of proposals dealing with energy storage systems that have highlighted the fire potential presented by lithium-ion and lithium metal batteries. Systems as small as 20 kWh or less would require the installation of a detection system. However, we have yet to fill in the blanks concerning these batteries in other occupancies and activities where there is a similar or greater potential for a fire event. This cycle there are additional topics covered by submittals such as battery collection and storage, personal mobility devices and emergency action plans.
To safely and effectively deal with the potential fire involving a thermal runaway involving a lithium-ion or lithium metal battery requires early

detection, a mitigation plan and suppression. This proposal is to cover the detection side of the equation.

907.2.2.2 is intended to capture testing, research and development activities where there can be an increased risk of thermal runaway and where in some cases it is intentional caused.

907.2.4.1 captures the manufacture of the batteries; and also captures the manufacture of vehicles, ESS and equipment where the battery is installed as part of the manufacturing process.

907.2.7.2 is a coordinating pointer where an M Group occupancy would require detection. based upon proposed Section 321.

907.2.10.2 is a coordinating pointer where a S Group would require detection based upon proposed Section 321.

Cost Impact: The code change proposal will increase the cost of construction
On a straight forward analysis this series of changes increases the cost construction. However, the majority of the medium to large size facilities involved in these activities do have detection and any new construction of this nature includes detection. Balanced against the cost of a fire that can not be extinguished routinely the installation of the early detection is ultimately a savings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal ties up a lot of the issues that were looked at already with lithium batteries and brings in the detection part which is a very important aspect of the early detection in these types of fires. (Vote: 14-0)

Final Hearing Results

F88-21 AS

F89-21

Original Proposal

IFC: 907.2.11, 907.2.11.3; IBC: [F] 907.2.11, [F] 907.2.11.3; IPMC: [F] 704.6, [F] 704.6.1.3

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] 907.2.11 Single- and multiple-station smoke alarms. *Listed* single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, ~~and~~ NFPA 72 and the manufacturer's published instructions.

[F] 907.2.11.3 Installation near cooking appliances. Smoke alarms shall ~~not~~ be installed a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance. ~~in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 907.2.11.1 or 907.2.11.2:~~

Exception: Smoke alarms shall be permitted to be installed between 6 ft. (1.8 m) and 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance where necessary to comply with Section 907.2.11.1 or 907.2.11.2.

1. ~~Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.~~
2. ~~Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.~~
3. ~~Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.~~

Reason: This proposal simply aligns the code requirements in IFC, IBC and IPMC with the current edition of NFPA 72 and the 8th Edition of UL 217. This proposal removes the outdated requirements related to specifying ionization or photoelectric smoke alarm technologies because all smoke alarms will be listed for resistance to common nuisance sources from cooking when the 2024 edition of the IFC, IBC and IPMCare published.
NFPA 72 Section 29.11.3.4(4)(2) requires smoke alarms to be listed for resistance to common nuisance sources from cooking in accordance with the 8th Edition of UL 217 or subsequent editions.The reason UL smoke alarm and detector standards have new performance tests is to reduce the frequency of unwanted alarm activation from normal cooking activities such as pan-frying, sauteing or baking. The new cooking resistance tests are necessary because normal cooking activities are he leading cause of unwanted alarm activations that result in homeowners removing or deactivating their smoke alarms. Therefore, the technology specific requirement for devices installed between 6 and 20 feet are now longer relevant.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply aligns the IBC and IFC with NFPA 72 and UL 217

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2021 International Fire Code

907.2.11 Single- and multiple-station smoke alarms.
Listed single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, NFPA 72 and the manufacturer's ~~published~~ instructions.

907.2.11.3 Installation near cooking appliances.
Smoke alarms shall be installed a minimum of 10 ft (3.0 m) horizontally from a permanently installed cooking appliance.

Exception: Smoke alarms shall be permitted to be installed~~between~~ a minimum of 6 ft. (1.8 m) ~~and 10 ft. (3.0 m)~~ horizontally from a permanently installed cooking appliance where necessary to comply with Section 907.2.11.1 or 907.2.11.2.

2021 International Building Code

[F] 907.2.11 Single- and multiple-station smoke alarms.
Listed single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, NFPA 72 and the manufacturer's ~~published~~ instructions.

[F] 907.2.11.3 Installation near cooking appliances.
Smoke alarms shall be installed a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance.

Exception: Smoke alarms shall be permitted to be installed~~between~~ a minimum of 6 ft. (1.8 m) ~~and 10 ft. (3.0 m)~~ horizontally from a permanently installed cooking appliance where necessary to comply with Section 907.2.11.1 or 907.2.11.2.

2021 International Property Maintenance Code

[F]704.6 Single- and multiple-station smoke alarms.
Single- and multiple-station smoke alarms shall be installed in existing Group I-1 and R*occupancies* in accordance with Sections 704.6.1 through 704.6.3.

[F]704.6.1.3Installation near cooking appliances.
Smoke alarms shall be installed a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance .

Exception: Smoke alarms shall be permitted to be installed~~between~~ a minimum of 6 ft. (1.8 m) ~~and 10 ft. (3.0 m)~~ horizontally from a permanently installed cooking appliance where necessary to comply with Section 704.6.1 or 704.6.2.

Committee Reason: The committee stated that the reason for the approval of the modification and the proposal was that it aligns the codes: IFC, IBC, IPMC and the referenced standard, NFPA 72, and removes some outdated requirements. (Vote: 14-0)

Final Hearing Results

F89-21 AM

F92-21

Original Proposal

IFC: 907.5.2.1.3, 907.5.2.1.3.1, 907.5.2.1.3.2; IBC: [F] 907.5.2.1.3, [F] 907.5.2.1.3.1, [F] 907.5.2.1.3.2

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] 907.5.2.1.3 Audible alarm signal frequency in Group R-1, ~~and~~ R-2 and I-1 sleeping rooms. Audiblealarm signal frequency in Group R-1, ~~and~~ R-2 and I-1 occupancies shall be in accordance with Sections 907.5.2.1.3.1 and 907.5.2.1.3.2.

[F] 907.5.2.1.3.1 Fire alarm system audible signal. In sleeping rooms of Group R-1, ~~and~~ R-2, and I-1 occupancies, the audible alarm signal activated by a fire alarm system shall be a 520-Hz low-frequency signal complying with NFPA 72.

[F] 907.5.2.1.3.2 Smoke alarm signal in sleeping rooms. In sleeping rooms of Group R-1, ~~and~~ R-2, and I-1 occupancies that are required by Section 907.2.8 or 907.2.9 to have a fire alarm system, the audible *alarm signal* activated by single- or multiple-station smoke alarms in the *dwelling unit* or *sleeping unit* shall be a 520-Hz signal complying with NFPA 72. Where a sleeping room smoke alarm is unable to produce a 520-Hz signal, the 520-Hz *alarm signal* shall be provided by a *listed* notification appliance or a smoke detector with an integral 520-Hz sounder.

Reason: This Proposal seeks to enhance the ability of residents in and I-1 Occupancies to awakened by the fire alarm system or smoke alarm by requiring the 520 Hz low frequency audible alarm signal. This proposal is needed because residents in I-1 Occupancies do not rely on trained staff to wake them and they are able to self-evacuate the building. Another FPRF Report, Waking Effectiveness of Alarms for Adults Who Are Hard of Hearing, concludes the 520 Hz low frequency is six times more effective than the standard 3 KHz signal at waking high risk segments of the population (people over 65, people who are hard of hearing, school age children and people who are alcohol impaired). The standard 3 KHz audible alarm signal has been used in all fire alarm horns and smoke alarms for the past 30 years.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
Cost Impact: The code change will increase cost of construction. The total installation cost will only increase in new R-1, R-2 and I-1 occupancies where a fire alarm system is required by Section 907 by requiring the use of the 520 Hz low frequency audible fire alarm signal in sleeping rooms of these occupancies. In accordance with the included cost analysis the “estimated” price increase is $57 per sleeping room for occupancies that are not required to utilize an emergency voice alarm communication (EVAC) system for occupant notification and approximately $107 per sleeping room for occupancies that are required to utilize an (EVAC) system for occupant notification.

For non-EVAC systems, the solution utilizes a currently available smoke detector with an integral low frequency sounder base instead of installing a smoke alarm and low frequency horn. For EVAC systems, the solution utilizes a currently available fire alarm system speaker and a smoke detector with an integral low frequency sounder base.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that the proposal increases the reduction of hazards for Group I-1 occupancies and they deserve to have low frequency alarms just as well as Groups R-1 and R-2. (Vote: 14-0)

Final Hearing Results

F92-21	AS

F96-21

Original Proposal

IFC: 909.18.3; IBC: [F] 909.18.3

Proponents: William Koffel, Koffel Associates, Inc., Air Movement and Control Association (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

[F] 909.18.3 Dampers. *Dampers* shall be tested for function in their installed conditionin accordance with NFPA 80 and NFPA 105.

Reason: Adding this reference to the appropriate NFPA standards for dampers clarifies and reinforces the applicable acceptance testing requirements. The statement as written in the 2021 IFC seems to omit some of the practices and requirements involved with damper acceptance testing. The clarification made by this proposal helps to detail these requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not increase cost since it does not make technical changes to damper acceptance testing requirements, but rather clarifies and aligns this section with other damper requirements, such as in 2021 IFC Section 706, where NFPA 80 and NFPA 105 are already mentioned.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was based on the proponent's reason statement. Additionally, it was noted by the committee that the reference to these standards is specifically regarding the testing aspect of the requirement because the section states dampers shall be tested for function in their installed condition in accordance with those standards. (Vote: 14-0)

Final Hearing Results

F96-21 AS

F98-21

Original Proposal

IFC: TABLE 911.1, 3307.2.1; IBC: TABLE 414.5.1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] TABLE 414.5.1 EXPLOSION CONTROL REQUIREMENTS[a, h]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems[b]
HAZARD CATEGORY			
Combustible dusts[c]	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required[k]
	Liquefied	Not Required	Required[k]
Flammable liquid	IA[d]	Not Required	Required
	IB[e]	Not Required	Required
Organic peroxides	U	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2[g]	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system[i]	—	Not Required	Required
Energy storage system[i]	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist[f]	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the *International Fire Code*.

c. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.8.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the *International Fire Code*.

i. Where explosion control is required in Section 1207 of the *International Fire Code*.

k Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 in/s (10 cm/s).

Reason: This change coordinates with the change in the definition of flammable gas. Explosive flammable gases do not include Category 1B flammable gases having a burning velocity of 3.9 in/s or less (Low BV). Table 911.1 has been modified accordingly. Category 1B low burning velocity flammable gases are excluded from the explosive flammable gas requirements.A reference to the International Mechanical Code has been added as an exception for the cleaning and purging of flammable gas piping systems requirements. Chapter 11 of the International Mechanical Code includes requirements for cleaning and purging using Category 1B low burning velocity flammable gases. This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change neither increased nor decreased in the cost of construction. The change clarifies that the requirements in these sections are applicable to Category 1A flammable gases.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved based upon the actions taken on G41-21, F3-21 and F192-21. There was a minor concern about the verbiage used for the burning velocity of "not exceeding" and that "not less than" is more appropriate. (Vote: 14-0)

Final Hearing Results

F98-21	AS

F99-21

Original Proposal

IFC: 912.5, 912.5.1 (New), 912.5.2 (New), 912.5.3 (New), 912.5.4 (New); IBC: [F] 912.5, [F] 912.5.2 (New), [F] 912.5.3 (New), [F] 912.5.1 (New), [F] 912.5.4 (New)

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Building Code

Revise as follows:

[F] 912.5 Signs. A metal sign ~~with raised letters not less than 1 inch (25 mm) in size~~shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: "AUTOMATIC SPRINKLERS," "STANDPIPES," or "TEST CONNECTION," <u>or “STANDPIPE AND AUTOSPKR or AUTOSPK AND STANDPIPE,"</u> or a combination thereof as applicable. ~~Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.~~

Add new text as follows:

<u>**[F] 912.5.2 Serving Multiple Buildings.** Where a fire department connection (FDC) services multiple buildings, structures or location, a sign shall be provided indicating the building, structures or locations served. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.</u>

<u>**[F] 912.5.3 Multiple or combined systems.** Where combination or multiple systems types are supplied by the fire department connection, the sign or combination of signs shall indicate both designated services.</u>

<u>**[F] 912.5.1 Lettering.** Each fire department connection (FDC) shall be designated by a sign with raised letters at least 1 inch (25.4mm) in height. For manual standpipe systems, the sign shall also indicate that the system is manual and that it is either wet or dry.</u>

<u>**[F] 912.5.4 Indication of pressure.** The sign also shall indicate the pressure required at the outlets to deliver the standpipe system demand.</u>

<u>Exception:</u> <u>The requirements of section 912.5.4 shall not be required where the pressure required is 150 psi (10.3 bar) or less</u>.

Reason: Currently both the IBC section 905.2 and IFC section 905.2 require the signage for fire department connection to meet the requirements found in NFPA 14 Standard for the Installation of Standpipes and Hose Systems. This amendment simply pulls those requirements into the IFC and IBC for quick identification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is already a requirement and is an editorial clarification.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that it is already a requirement in NFPA 14 and it is a good pointer to include for the inspectors as a clarification. (Vote: 14-0)

Final Hearing Results

F99-21	AS

F100-21

Original Proposal

IFC: 915.5, 915.5.1, 915.5.2, 915.6, NFPA Chapter 80; IBC: [F] 915.5, [F] 915.5.2, [F] 915.5.1, NFPA Chapter 35; IPMC: [F] 705.2, NFPA Chapter 08

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] 915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

[F] 915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA ~~720~~ 72.

[F] 915.5.1 General. Carbon monoxide detection systems shall comply with NFPA ~~720~~ 72. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

~~720—15~~ ~~Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment~~

Reason: In August 2015, the NFPA Standards Council voted to relocate the material in the 2015 edition of NFPA 720,*Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, into the 2019 edition of NFPA 72,*National Fire Alarm and Signaling Code*. This Proposal replaces references to NFPA 720 with NFPA 72.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal only updates the standard.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal is necessary to reference the correct standard. (Vote: 14-0)

Final Hearing Results

F100-21	AS

F102-21

Original Proposal

IFC: CHAPTER 9, SECTION 915, 915.1, 915.1.1, 915.1.2, 915.1.3, 915.1.4, 915.1.5, 915.1.6, 915.2, 915.2.1, 915.2.2, 915.2.3 (New), 915.2.34, 915.3, 915.4, 915.4.1, 915.4.2, 915.4.3, 915.4.4, 915.4.5 (New), 915.5, 915.5.1, 915.6, 915.5.2, 915.6.1, 915.5.3;

IBC: CHAPTER 9, SECTION 915 (All [F]), 915.1, 915.1.1, 915.1.2, 915.1.3, 915.1.4, 915.1.5, 915.1.6, 915.2, 915.2.1, 915.2.2, 915.2.3 (New), 915.2.34, 915.3, 915.4, 915.4.1, 915.4.2, 915.4.3, 915.4.4, 915.4.5 (New), 915.5, 915.5.1, 915.6, 915.5.2, 915.6.1, 915.5.3

Proponents: Kris Hauschildt, self (krishauschildt@yahoo.com)

Reason: This proposal seeks to establish uniform baseline requirements for CO detection in all occupancies with permanently installed fuel-burning appliances, fuel-burning fireplaces or attached garages. CO poisoning incidents resulting in deaths and injuries continue to happen with alarming regularity in occupancies not covered by the current IFC as well as those that are, demonstrating that current code requirements are not adequately inclusive and are not effectively targeting problem areas within specific occupancies.
The suggested revisions contained in this proposal are based on *"Development of a Technical Basis for CO Detector Siting," "Diffusion of CO Through Gypsum Wallboard,"* the New York State Fire Code which has required CO detection in all commercial occupancies since 2015, and data from individual case examples (see attachment and bibliography).

Requiring CO detection in all occupancies that contain known CO hazards will prevent an untold number of deaths and injuries.

Substantiation for Uniform Baseline Requirements for CO detection in All Occupancies

The lethality of CO is undisputed. The severity of poisoning injury depends not only on the level and duration of CO exposure, but also on the individual. Those most at risk from the effects of CO: infants and children, older people, pregnant women/unborn babies, and those with underlying health conditions. There is no formula that can accurately predict how CO will impact a particular person nor what level or duration of exposure can be tolerated without suffering prolonged harm, irreversible brain damage, or death. For many victims who survive a CO exposure, the effects do not end with the poisoning incident. They can be severe enough to cause death weeks to months later. They can also cause irreversible effects, including life-altering brain injury.

"In addition to the immediate onset effects of exposure, delayed-onset development of neuropsychiatric impairment typically occurs from several days to approximately 3–4 weeks after exposure, with symptoms including inappropriate euphoria, impaired judgment, poor concentration, memory loss, cognitive and personality changes, psychosis, and Parkinsonism. Symptoms of acute carbon monoxide poisoning in children are the same as those in adults. Acute carbon monoxide poisoning during pregnancy has been associated with spontaneous abortion and fetal death."

- Agency for Toxic Substances & Disease Registry, CDC

The lifesaving value of CO detection is undisputed. CO detection has been commercially available for at least 30 years and has proven reliability. There is no substitute for the early detection that these devices provide, alerting to danger before conditions escalate to a level of causing harm. In the absence of detection, it is the building occupants who are providing the alert to CO leaks, becoming ill or dying before building staff are even aware there is a problem. Some examples:

2013, North Carolina: My parents both died in a **hotel** room from a CO leak while they were on vacation. They lost consciousness and lay helpless all night, inhaling poison for over 14 hours until they died. No one in the building was even aware they were in danger. There was no CO detection onsite despite there being gas fireplaces in the guest rooms, a gas pool heater, gas dryers and gas water heaters. First responders (EMS, police, fire dept) suspected CO but thought it was more likely they both died of heart attacks so didn't bother to test the room, opting instead to wait weeks for autopsy toxicology results. The leak continued for another seven weeks, killing an 11-year-old boy and causing permanent injury to his mother in the same room before it was finally detected. Multiple people were ill at the hotel during those seven weeks, including guests and a repairman servicing the elevator which was located next to the leaking exhaust system.

2017, Michigan: A 13-year-old boy at a spring break swim party with his friends died on the deck of a **swimming pool** from CO leaking from a pool heater in an adjacent room. His friends suffered CO injury as well as head injuries when they lost consciousness and fell onto the concrete pool deck. An employee along with multiple firefighters suffered CO injuries responding to the incident.

** There is specific concern over the number of incidents in **indoor swimming pool areas** that have resulted in poisoning injuries to children. CO exposure in a pool also leads to an increased risk of drowning. These incidents are detailed on the attached spreadsheet.

2014, New York: A **restaurant** manager died from CO leaking from a fuel burning appliance in the room adjacent to his office. The assistant manager lost consciousness and suffered CO injury when she went looking for him. Multiple rescue personnel became injured as well when they rushed in to render aid, unaware they were entering a CO contaminated environment. 24 people were hospitalized including restaurant patrons. The manager had reportedly been ill for weeks prior, but neither he nor his doctors suspected it as being CO-related.

1995, California: A woman and her husband were poisoned in a **hotel** room, not found until 36 hours later – he died, she survived with permanent injury to her brain, so severe she was prevented from ever being able to work or live independently again. 25 years later, she lives in a specialized group home.

2006, Maryland: 20 **restaurant** workers suffered long term brain injury after being exposed to a CO leak that had gone unnoticed for weeks and progressed to a level of 700ppm in the dining area before problem was discovered.

2019, Ohio: CO leak at **correctional facility** caused poisoning injuries to 4 staff and 29 inmates

2019, Illinois: CO leak at a **dry cleaners**, 3 people taken to the hospital including a police officer

2019, Utah: 60 people were poisoned at a **church** from CO leaking from a boiler, having spent several hours breathing in CO levels measured at 200-500ppm. Many were projected to have long term health effects.

2021, Nebraska: 10 people poisoned at a **bowling alley**, 4 hospitalized.

According to NFIRS (National Fire Incident Reporting System) data, there were a total of 10,715 CO incidents in hotels/motels, churches, restaurants/cafeterias, bars/taverns, and K-12 schools between 1999 and 2018. This is a minimum number. Participation in the NFIRS system is voluntary and not all fire departments participate.

Further, deaths and injuries are occurring even in buildings equipped with CO detection, demonstrating the need for occupancy specific focus for future improvements beyond a baseline requirement:

2017, Texas: A couple was poisoned and found unconscious in their hotel room from CO leaking from a pool heater. The hotel was equipped with unmonitored CO detection. A couple staying a few doors down had removed the batteries from the CO alarm in their room after it had gone off multiple times during the night. The couple found unconscious later died of their CO related injuries.

2018, Tennessee: Several people were poisoned in a hotel exercise room, located on a floor with a pool but no guest rooms. The hotel reportedly had CO detection, but only on floors with guest rooms.

2019, Illinois: A couple was poisoned in their hotel room equipped with a CO alarm that was alarming, but a hotel maintenance worker told them to disregard the alarm. They ended up calling the fire department themselves and were treated at a hospital for CO poisoning.

As a homeowner it is a reasonable expectation to be aware of the hazards of CO and take responsibility to install CO detection to protect yourself. However, as an occupant of a building that is under someone else's charge, there is no way to know of equivalent hazards nor whether action has been taken to install safeguards. Combined with no human ability to detect CO, this leaves occupants critically vulnerable during any type of CO exposure incident. Their life safety is entirely at the mercy of circumstances they have no knowledge of and no control over, assuming a risk they did not choose to take.

Building and business owners rely on guidance from this code to provide basic life safety provisions for occupants. States rely on guidance from this code to pass safety legislation. People rely on this code to stay safe and keep their families safe from preventable death and harm. Emergency responders rely on this code to keep them safe from unnecessary risk in performing their already hazardous jobs.

Please act to protect people from unnecessary death and injury by approving this proposal to provide a baseline level of safety from carbon monoxide danger in all occupancies.

2021 IFC – Chapter 1 Scope and Administration

101.3 Intent.

The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Bibliography: **SUPPORT DOCUMENTS FOUND AT THE FOLLOWING LINK**

- **https://thejenkinsfoundation.com/category/ifc-2024-proposal-support-do** cuments/

- Swimming Pool CO Incident Log
- Toxicological Profile for Carbon Monoxide - Agency for Toxic Substances & Disease Registry, CDC
- Development of a Technical Basis for Carbon Monoxide Detector Siting, NFPA Fire Protection Research Foundation, 2007
- 2020 Fire Code New York State
- Diffusion of Carbon Monoxide Through Gypsum Wallboard, Neil Hampson, MD
- Carbon Monoxide Poisoning, Lindell Weaver, MD, 2020
- Hotel/Motel CO Incident Log 1967-to date, Jenkins Foundation
- Commercial Building CO Incidents, Jenkins Foundation
- CO Detection and Alarm Requirements: Literature Review, NFPA Fire Protection Research Foundation, 2021
- Cost of Accidental Carbon Monoxide Poisoning: A Preventable Expense, Preventive Medicine Reports, 2016
- CO Incidents - NFIRS (National Fire Incident Reporting System) Data - REM Risk
- Carbon Monoxide Poisonings in Hotels and Motels: The Problem Silently Continues, Prev. Medicine Reports, 2019
- Carbon Monoxide Poisoning at Hotels, Motels and Resorts, Amer. Journal of Prev. Medicine, 2007
- NEMA - Life Fire Safety - Carbon Monoxide

Cost Impact: The code change proposal will increase the cost of construction
This code change proposal will increase the cost of construction but is crucial for life safety.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that it is proposing an all-encompassing requirement to put carbon monoxide alarms everywhere without statistical data for all these other occupancies than what is currently covered in the code.
Additionally, it was noted that the expansion of carbon monoxide detection throughout all the different occupancies will have very little impact to the majority of the deaths due to carbon monoxide poisoning since 54% of carbon monoxide deaths occurred in a home and over 60% of carbon monoxide poisoning deaths were due to suicide. The current minimum requirements in the IFC and IBC are helping to continue to reduce these incidents, but the leading cause is in education of the general public, increasing the cost of construction requiring these devices is not going to provide much benefit as increasing education will. An apology was given to everybody who spoke about their losses and as stated it is an awful thing to happen but the incidents that were presented were in occupancies that, the overwhelming majority, are already required by the IBC and IFC to have these devices and in existing buildings which are also already required to have these devices. Several states, including New Jersey and Washington, were discussed by the committee as examples of jurisdictions that already had specific requirements in place. In closing it was stated that this proposal is a good start in a good direction, and the committee applauded the proponents that put the proposal together. (Vote: 12-0)

Public Comments

Public Comment 1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 915 CARBON MONOXIDE DETECTION .

915.1 General . Carbon monoxide detection shall be installed in new buildings in accordance with~~Sections~~ Section 915.1.1. ~~through 915.6~~ . Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.

Exception: Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.

915.1.1 Where required . Carbon monoxide detection shall be installed ~~provided in Group A, B, E, F, H, I, M, and R occupancies~~in the locations specified in Section 915.2 where any of the following conditions ~~in Sections 915.1.2 through 915.1.6~~ exist.

1. In buildings that contain a CO source.
2. In buildings that contain or are supplied by a CO producing forced-air furnace
3. In buildings with attached *private garages*
4. In buildings that have a CO producing vehicle that is used within the building

915.1.2 ~~**Fuel-burning fireplaces.** Carbon monoxide detection shall be provided in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies that contain a fuel-burning fireplace.~~

915.1.3 ~~**Fuel-burning forced-air furnaces.** Carbon monoxide detection shall be provided in the following locations served by a fuel-burning, forced-air furnace:~~

1. ~~In a central or otherwise approved location in each HVAC zone on every floor level that is served by a fuel-burning forced air-furnace.~~
2. ~~In dwelling units, sleeping units, classrooms in Group E occupancies and areas containing a swimming pool that are served by a fuel-burning forced-air furnace.~~

~~**Exception:** Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.3, Items 1 or 2, where a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an *approved* onsite location or to an approved off-premises location in accordance with NFPA 72.~~

915.1.4 ~~**Fuel-burning appliances..** Carbon monoxide detection shall be provided in the following locations in buildings that contain fuel-burning appliances:~~

1. ~~In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that contain a fuel-burning appliance~~.
2. ~~In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that have communicating openings between the fuel-burning appliance and the room, area, dwelling unit, sleeping unit or classroom; or in an approved location between the fuel-burning appliance and the room, area dwelling unit, sleeping unit or classroom.~~
3. ~~In dwelling units, sleeping units, classrooms in Group E occupancies, and areas containing a swimming pool~~.

-

~~**Exception:** Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.4, Item 3, where a carbon monoxide detector is provided in each room, area, dwelling unit, sleeping unit, or classroom in Group E occupancies that shares a common wall, ceiling or floor with the room or area containing the fuel-burning appliance, and the carbon monoxide alarm signals are automatically transmitted to an approved onsite location or to an off-premises location in accordance with NFPA 72.~~

915.1.5 ~~**Private garages.** Carbon monoxide detection shall be provided in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies in buildings with attached private garages.~~

~~**Exceptions:**~~

1. ~~Carbon monoxide detection shall not be required in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies without communicating openings between the private garage and the room, area, *dwelling unit*, *sleeping unit* or classroom.~~
2. ~~Carbon monoxide detection shall not be required in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies located more than one story above or below a private garage.~~
3. ~~Carbon monoxide detection shall not be required where the private garage connects to the building through an *open-ended corridor*.~~
4. ~~Where a carbon monoxide detector is provided in an *approved* location between openings to a private garage and rooms, areas, *dwelling units*, *sleeping units* or classrooms in Group E occupancies~~.

915.1.6 ~~**Exempt garages.** For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.~~

915.2 Locations . ~~Where required by Section 915.1.1, carbon~~ Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.6 ~~915.2.~~.

915.2.1 Dwelling units . Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a ~~fuel-burning appliance~~ CO source is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units . Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a ~~fuel-burning appliance~~ CO source and is not served by a carbon monoxide producing forced-air furnace.

915.2.3 ~~**Areas containing a swimming poo**~~**l.** ~~Carbon monoxide detection shall be installed in areas containing a swimming poo~~l.

~~**Exception:** Where there is a conflict between the requirements of this code and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.~~

915.2.4 915.2.3 Group E occupancies . A ~~Carbon~~ carbon monoxide system that utilizes carbon monoxide detectors shall be installed in ~~classrooms~~ in Group E occupancies. Alarm signals from ~~Carbon~~ carbon monoxide detectors ~~alarm signals~~ shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.

915.2.4 CO producing forced-air furnace . Carbon monoxide detection, complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.

Exceptions:

1. Where a carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.
2. Dwelling units that comply with Section 915.2.1.

915.2.5 Private garages . Carbon monoxide detection, complying with Item 3 of Section 915.1.1, shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached private garage.

Exceptions:

1. In buildings without communicating openings between the private garage and the building.
2. In rooms or spaces located more than one story above or below a private garage.
3. Where the private garage connects to the building through an open-ended corridor.
4. An open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.
5. Dwelling units that comply with Section 915.2.1.

915.2.6 All other occupancies . For locations other than those specified in Section 915.2.1 through 915.2.5, carbon monoxide detectors shall be installed on the ceiling of enclosed rooms or spaces containing CO producing devices or served by a CO source forced-air furnace.

Exception: Where environmental conditions prohibit the installation of carbon monoxide detector in an enclosed room or space, carbon monoxide detectors shall be installed in an approved contiguous enclosed location to the room or space that contains a CO source.

915.3 Carbon monoxide detection . Carbon monoxide detection required by Sections 915.1 through ~~915.2.4~~ 915.2.6 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.3.1 Alarm limitations. . Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.3.2 Fire alarm system required . New buildings that are required by Section 907.2 to have a fire alarm system and where carbon monoxide detectors are required by Section 915.2, they shall be connected to the fire alarm system in accordance with NFPA 72.

915.3.3 Fire alarm systems not required . New buildings that are not required by Section 907.2 to have a fire alarm system, carbon monoxide detection shall be provided by one of the following:

1. Carbon monoxide detectors connected to an approved carbon monoxide detection system in accordance with NFPA 72.
2. Carbon monoxide detectors connected to an approved combination system in accordance with NFPA 72.
3. Carbon monoxide detectors connected to an approved fire alarm system in accordance with NFPA 72.
4. Where approved by the fire code official, carbon monoxide alarms are permitted to be installed where maintained in accordance with the manufacturer’s instructions.

915.3.4 Installation . Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer’s instructions.

915.4 Carbon monoxide alarms . Carbon monoxide alarms shall comply with Sections 915.4.1 through ~~915.4.5~~ 915.4.4.

915.4.1 Power source . Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms ~~powered by a 10-year battery~~ shall be an acceptable alternative.

915.4.2 Listings . Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

915.4.3 ~~Locations.~~ ~~Carbon monoxide alarms shall only be installed in *dwelling units* and in *sleeping units*. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.~~

~~915.4.4~~915.4.3 Combination alarms . Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

915.4.4 Interconnection . Where more than one carbon monoxide alarm is required to be installed, carbon monoxide alarms shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

915.4.5 ~~Installation requirements~~. ~~Where required by Sections 915.1.1 through 915.5.3, carbon monoxide alarms shall be installed in accordance with Sections 915, NFPA 72, and the manufacturer's installation instructions. Where there is a conflict between the requirements of this code, NFPA 72, and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.~~

915.5 Carbon monoxide detection systems . Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General . ~~Carbon monoxide detection systems shall comply with NFPA 720.~~ Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.5.2 Locations . Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72 ~~.~~

915.5.3 Combination detectors . Combination carbon monoxide/smoke detectors ~~installed in carbon monoxide detection systems~~ shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

915.5.4 Occupant Notification . Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the building.

> **Exception:** Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety plan provided the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.

915.6 Maintenance . Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 72 ~~720~~. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.6.1 Enclosed parking garages . Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

Commenter's Reason: This is the first of three related public comments encompassing proposal F102-21 and proposal F116-21. This first public comment is meant to reorder the original proposed change, and address language concerns expressed by the committee.
The intent of the public comment is to require CO detection anywhere that a Carbon Monoxide Producing Device is present. The public comment will allow for either a CO detection system, or CO alarms. The proponent realizes that the cost of a full system might be cost prohibitive. In this vein, the intent is to allow for the following alternatives.

1. Permit the use of standalone CO alarms where there is no fire alarm system present
2. The addition of CO detectors (With notification) in places where a Fire Alarm System is already present
3. The addition of CO detectors attached to security systems that an occupant may have. (As allowed by NFPA 72)

This public comment reorders section 915 so that it first addresses under what circumstances CO detection is needed. The public comment is designed to cover permanent CO sources, including regularly used vehicles, and not temporary conditions such as floor cleaners that are brought in periodically, or the use of appliances such as BBQ grills that were never intended for indoor use. Similarly, the public comment is not intended to apply to things like candles or gelled alcohol cans used in chaffing dishes. The next part of the public comment specifies where CO detection devices are placed to provide the best protection. The next section deals with the installations themselves, including that the devices must comply with NFPA 72, that they need to be hardwired, and that they are interconnected.

This public comment is needed to address occupant notification because many system designers and code authorities are uncertain if carbon monoxide notification appliances (horns and strobes) are required to be installed throughout the building, like fire alarm notification appliances, or if occupant notification can be limited to specific rooms, areas, or spaces. The public comment provides clear language in the Code that carbon monoxide notification appliances are permitted, but not required, to be installed throughout the building and specifies the selective occupant notification locations. The proposed revisions are consistent with similar requirements included in Section 23.8.6.1.2 of the 2019 edition of NFPA 72.

In discussions with opponents, the cost of installation is a concern. The total installed cost of a CO detector in a commercial occupancy that already has an alarm system is approximately $325 per detector. This includes the device, a sounder base, conduit, conductors and the installation labor. A larger occupancy not already required to have CO detection under current code might require 5-6 devices, whereas smaller occupancies might only require 1 or 2. On the other hand, lawsuits from deaths and injuries due to CO poisoning have routinely settled in the millions of dollars. For example, a 2010 settlement with employees of Ruth's Chris Steakhouse cost the company $34 million. 2 devices installed for less than $1000 would have saved them the settlement, and more importantly would have prevented the injury to begin with. This also doesn't cover the lost business time from the original incident or the cost of defending the lawsuit. CO detectors and alarms are an effective way to alert occupants to the presence of CO before they become sick, or die from the exposure and is relatively inexpensive compared to other fire protection systems and the associated costs of having an incident.

Another point of contention is that CO alarms are not listed for use in all occupancies, and thispublic comment allows for Fire Code Official to allow their use. Currently, the scope of the UL product standard for CO alarms does not list CO alarms for use outside of dwelling units/sleeping units. However, putting a requirement in the code should not be predicated upon a UL product standard allowing it. Rather, the UL standard should test to what the code requires. An implementation several years out, UL will be able to adjust their standard, or create a new one to address the issue. The fact of the matter is that a CO alarm will detect CO regardless of the occupancy class, and a procedural issue does not change that.

We know that these devices are extremely effective at preventing CO injuries and deaths. We also know that this is something that the code can have an immediate effect on, and many states, including New York and New Jersey already have laws requiring CO detection in all occupancies where CO can accumulate.

Lastly, it is not the intent of this public comment to address temporary situations like equipment brought in for a specific maintenance task, nor is it intended to address temporary conditions like heating in tents or other special event structures that do not have permanent CO producing devices. This will be addressed in a future code change proposal in another cycle.

To avoid confusion, what follows is how the text would appear if approved:

SECTION 915 CARBON MONOXIDE DETECTION.

915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.

Exception: Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.

915.1.1 Where required. Carbon monoxide detection shall be installed in the locations specified in Section 915.2 where any of the following conditions exist.

1. In buildings that contain a CO source.
2. In Buildings that contain or are supplied by a CO producing forced-air furnace
3. In buildings with attached *private garages*
4. In buildings that have a CO producing vehicle that is used within the building

915.2 Locations. Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.6.

915.2.1 Dwelling units. Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a CO source is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a CO source and is not served by a carbon monoxide producing forced-air furnace.

915.2.3 Group E occupancies. A carbon monoxide system that utilizes carbon monoxide detectors shall be installed in in Group E occupancies. Alarm signals from carbon monoxide detectors shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.

915.2.4 CO producing forced-air furnace. Carbon monoxide detection, complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.

Exceptions:

1. Where a carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

2. Dwelling units that comply with Section 915.2.1.

915.2.5 Private garages. Carbon monoxide detection, complying with Item 3 of Section 915.1.1, shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached private garage.

Exceptions:

1. In buildings without communicating openings between the private garage and the building.

2. In rooms or spaces located more than one story above or below a private garage. 3 . Where the private garage connects to the building through an open-ended corridor. 4. An open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage. 5. Dwelling units that comply with Section 915.2.1.

915.2.6 All other occupancies. For locations other than those specified in Section 915.2.1 through 915.2.5, carbon monoxide detectors shall be installed on the ceiling of enclosed rooms or spaces containing CO producing devices or served by a CO source forced-air furnace.

Exception: Where environmental conditions prohibit the installation of carbon monoxide detector in an enclosed room or space, carbon monoxide detectors shall be installed in an approved contiguous enclosed location to the room or space that contains a CO source.

915.3 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.6 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.3.1 Alarm limitations. Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.3.2 Fire alarm system required. New buildings that are required by Section 907.2 to have a fire alarm system, where carbon monoxide detectors are required by Section 915.2 they shall be connected to the fire alarm system in accordance with NFPA 72.

915.3.3 Fire alarm systems not required. New buildings that are not required by Section 907.2 to have a fire alarm system, carbon monoxide detection shall be provided by one of the following:

1. Carbon monoxide detectors connected to an approved carbon monoxide detection system in accordance with NFPA 72.

2. Carbon monoxide detectors connected to an approved combination system in accordance with NFPA 72.

3. Carbon monoxide detectors connected to an approved fire alarm system in accordance with NFPA 72.

4. Where approved by the fire code official, carbon monoxide alarms are permitted to be installed where maintained in accordance with the manufacturer’s instructions.

915.3.4 Installation. Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer's instructions.

915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.

915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

915.4.2 Listings. Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

915.4.3 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

915.4.4 Interconnection. Where more than one carbon monoxide alarm is required to be installed, carbon monoxide alarms shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

915.5.4 Occupant Notification. Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the building.

Exception: Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety plan provided the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 72 . Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.**915.6.1 Enclosed parking garages.** Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction The overall proposal

will increase the cost of construction but it is hoped that this Public Comment will make it more clear where such protection is needed and may reduce the overall cost.
In occupancies not already required to have CO detection, the cost of installing new devices attached to a system is approximately $325 per device, with many occupancies only requiring 4-6 devices for larger occupancies, and 1-2 devices for smaller occupancies.

In places where a stand-alone alarms are allowed by the proposal, the cost of a new device will cost between $25 and $60 per device.

Public Comment 2

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

CARBON MONOXIDE SOURCE . A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.

2021 International Building Code

CARBON MONOXIDE SOURCE . A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.

Commenter's Reason: This is the second of 3 related proposals. This proposal simply adds a definition for Carbon Monoxide Source. This will clarify that only permanently installed or used sources in a building such as gas fired heaters or propane powered forklifts that are part of the daily operations of a space are included, and that things like candles and floor polishers are not intended to be captured. Additionally, this shortens the code language so that not every iteration of something that produces CO is written in several places in the code.
This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The overall proposal will increase the cost of construction. This PC is merely adding a new definition to the IFC and IBC to clarify how the provisions are intended to apply. This PC in and of itself does not further impact cost as it is only a definition.

Final Hearing Results

F102-21	AMPC1,2

F104-21

Original Proposal

IFC: 915.5, 915.5.1, 915.5.2, 915.5.3, 915.5.4 (New); IBC: [F] 915.5, [F] 915.5.1, [F] 915.5.2, [F] 915.5.3, [F] 915.5.4 (New)
Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] 915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through ~~915.5.3~~ 915.5.4.

[F] 915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

[F] 915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

[F] 915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are listed in accordance with UL 268 and UL 2075.

Add new text as follows:

[F] 915.5.4 Duct detection. Carbon monoxide detectors placed in environmental air ducts or plenums shall not be used as a substitute for the required protection in Section 915 of the Code.

Reason: This Proposal seeks to prevent a potential life safety issue by prohibiting duct mounted carbon monoxide (CO) detectors from being installed in lieu of "open area" CO detectors or alarms. This change is needed for the following reasons:

1. Duct mounted CO detectors are commercially available, but we are not aware of any that are listed to UL 2075 or UL 2034, or that can comply with those standards.
2. Duct mounted CO detectors have been proposed for use in applications where CO detection is needed, which has created confusion for designers and code officials.
3. When the HVAC system is not moving significant quantities of air duct mounted CO detectors cannot accurately detect potentially hazardous levels of CO in the rooms served by the HVAC system.
4. This proposal should remove confusion about duct mounted CO detectors being used as the required means of providing code mandated protection.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal just restricts the use of a technology not covered by referenced standards such as UL 2075/UL 2034.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that carbon monoxide levels really need to be measured in the area of human occupancy since that is what we're trying to determine and what initiates an alarm if there's a problem. Additionally, it was noted that it avoids a life safety issue that could be created by the substitution. (Vote: 13-0)

Final Hearing Results

F104-21	AS

F105-21

Original Proposal

IFC: 917.1, 917.2 (New); IBC: [F] 917.1, [F] 917.2 (New)
Proponents: Richard Roberts, Honeywell, Automatic Fire Alarm Association (AFAA) (richard.roberts@systemsensor.com)

2021 International Building Code

Revise as follows:

[F] 917.1 College and university campuses. Prior to construction of a new building requiring a fire alarm system on a multiple-building college or university campus having a cumulative building *occupant load* of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.

Add new text as follows:

[F] 917.2 Group E Occupancies. Priorto construction of a new building containing a Group E occupancy requiring a fire alarm system having an occupant load of 500 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

Reason: Reason:
This proposal seeks to reduce the number of injuries and fatalities in new schools from all types of emergencies including but not limited to fire, human-caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters. This proposal is needed to enhance public life safety in Group E occupancies from all emergencies, but most importantly from a significant increase in human-caused incidents in recent years. According to a FBI Report, titled that details the active shooter incidents from 2000 to 2018, 171 people killed in education occupancies. Another FBI Report provides a list of incidents during the 2000-2018 time period showing other incidents. The Proposal is ***only*** requiring a mass notification risk analysis to be performed. If, and only if the findings of the risk analysis conclude a mass notification system is needed, then a mass notification system shall be provided.

Every facility is unique and has specific risks. A risk analysis is a process to determine the likelihood, vulnerability, and magnitude of all potential emergencies. The complexity of the risk analysis should be commensurate to the complexity of the building(s) and hazards being considered. The risk analysis will determine if a mass notification system is needed and the type of a mass notification system that best meets the specific needs of the building. This is important because mass notification is defined as "a technology capable of sending different layers of messaging that provides real-time information to groups of individuals within buildings, campus settings, geographic regions, or entire nations by using one or a combination of the following technologies:

Layer 1:

- Voice messages
- Visible notification appliances
- Digital signage

Layer 2:

- Wide-area outdoor mass notification systems

Layer 3:

- Text messages
- Emails

- Tactile devices
- Computer pop-ups

Layer 4:

- Social networks
- Radio broadcast
- Television broadcast
- Weather radios

Moreover, the key to determine if a mass notification system is required is to review Fire Safety and Evacuation Plan in-conjunction with the mass notification risk analysis. The risk analysis may identify hazards that are facility specific that lead to specific response plans with specific communication system requirements for that facility.

It should be noted that an in-building fire alarm emergency voice alarm communication (EVAC) system is one type of a mass notification system that provides on-way voice messages to people inside buildings. The IFC currently requires a fire alarm system that uses EVAC speakers for occupant notification instead of horns to be installed in new schools with an occupant load greater than 100. If the risk analysis determines a mass notification system is needed, there may be no additional cost for the control unit because many EVAC systems are listed for mass notification in accordance with UL 2572, *Standard for Mass Notification Systems*.

However, most mass notification systems do not support all the technologies listed under Layers 1-4. For example, in a school for the deaf, a risk analysis would tend to identify a greater than usual risk for occupants due to a higher than average deaf population, leading to emergency response plans requiring digital signage. EVAC systems or MNS systems that did not support digital signage capabilities should not be approved for this facility.

Requiring a risk analysis will result in a more comprehensive emergency response plan that is customized for the specific hazards and risks associated with the building or campus. The risk analysis and emergency response plan can be as elaborate or as basic as the Fire Code Official and building owner determines it needs to be. In some cases, other types of one-way communications may be needed to provide effective protection. Section 403 of the Code requires a Fire Safety and Evacuation Plan be developed for educational occupancies and Section 404 requires that when a Lockdown Plan is developed, it must be approved by the Fire Code Official. These sections require communication of the emergency to the building occupants be included in the plan. This Proposal ***only*** emphasizes the need to document how communicating with the occupants of the building and possibly occupants that are outside the building will be accomplished. It will encourage the use of the EVAC system that is already required as a part of the fire alarm construction.

This proposal ***is not automatically*** requiring the installation of any mass notification systems. Rather, it***only*** requires a risk analysis be conducted for a new building containing a Group E occupancy having an occupant load of 500 or more. Furthermore, the risk analysis for a new building that is part of a campus with existing buildings may determine the existing buildings are not required to be upgraded with a mass notification system. The responsibility for the risk analysis rests on the building owner who may employ the necessary professionals to satisfy the requirements.

Bibliography: FBI Reports

- Active Shooter Incidents: Topical One-Pagers, 2000 - 2018
- 2000 to 2018 Active Shooter Incidents

Cost Impact: The code change proposal will increase the cost of construction
The cost of the risk analysis will be based on the complexity of the facility, and in many cases, there will be no additional costs as the emergency planning is already required. In extreme cases, the risk analysis may cost thousands of dollars to produce an expansive report of risks and strategies to mitigate those risks. When the EVAC system is identified as the only means of mass communication needed, there will be no increased cost of construction. If the conclusion of the risk analysis identifies the need for messages beyond one-way EVAC systems such as visible, digital, or text messages there will be some additional expense for those systems. It must be noted an EVAC system is already required by the Code for Group E occupancies and many EVAC systems are listed for mass notification in accordance with UL 2572, *Standard for Mass Notification Systems.*

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that it only requires that a risk assessment be performed to determine if a mass notification system is needed. By providing this requirement, it will allow for ample consideration for the inclusion of such a system in facilities where small children and youth will be regularly present. Additionally, it was noted that this has already been put this in the code for colleges and universities, so it makes sense to provide it for younger children as well. (Vote: 13-0)

Final Hearing Results

F105-21	AS

F162-21

Original Proposal

IFC: TABLE 2704.2.2.1; IBC: TABLE 415.11.1.1.1

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

TABLE 415.11.1.1.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
PHYSICAL-HAZARD MATERIALS				
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose	Note b	Not Applicable	Not Applicable
	Baled	Notes b and c		
Combustible liquid	II	Not Applicable	~~0.01~~ 0.02	Not Applicable
	IIIA		~~0.02~~ 0.04	
	IIIB		Not Limited	
Combination Class	I, II and IIIA		~~0.04~~ 0.08	
Cryogenic gas	Flammable	Not Applicable	Not Applicable	Note d
	Oxidizing			~~1.25~~ 2.5
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous	Not Applicable	Not Applicable	Note d
	Liquefied			Note d
Flammable liquid	IA	Not Applicable	~~0.0025~~ 0.005	Not Applicable
	IB		~~0.025~~ 0.05	
	IC		~~0.025~~ 0.05	
Combination Class	IA, IB and IC		~~0.025~~ 0.05	
Combination Class	I, II and IIIA		~~0.04~~ 0.08	
Flammable solid		~~0.001~~ 0.002	Not Applicable	Not Applicable
Organic peroxide	Unclassified detonable	Note b	~~Not Applicable~~ Note b	Not Applicable
	Class I	Note b	Note b	
	Class II	~~0.025~~ 0.05	0.0025	
	Class III	~~0.1~~ 0.2	.02	
	Class IV	Not Limited	Not Limited	

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
	Class V	Not Limited	Not Limited	
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	1.25 2.5
	Liquefied			1.25 2.5
Combination of gaseous and liquefied				1.25 2.5
Oxidizer	Class 4	Note b	Note b	Not Applicable
	Class 3	0.003 0.006	0.03 0.06	
	Class 2	0.003 0.006	0.03 0.06	
	Class 1	0.003 0.006	0.03 0.06	
Combination Class	1, 2, 3	0.003 0.006	0.03 0.06	
Pyrophoric materials		0.01 Note b	0.00125 0.0025	Notes d and e
Unstable (reactive)	Class 4	Note b	Note b	Note b
	Class 3	0.025 0.05	0.0025 0.005	Note b
	Class 2	0.1 0.2	0.01 0.02	Note b
	Class 1	Not Limited	Not Limited	Not Limited
Water reactive	Class 3	0.01 0.02[f]	0.00125 0.0025	Not Applicable
	Class 2	0.25 0.5	0.025 0.05	
	Class 1	Not Limited	Not Limited	
HEALTH-HAZARD MATERIALS				
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note d
Toxics		Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot = 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.1(1) and 307.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.5.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

Reason: The proposed changes are consistent with the limits identified in Table 5.5.2, NFPA 318. The proposed higher densities are needed to meet current manufacturing needs. In addition, advances in technology have resulted in reducing the fire risk associated with workstations and tools both with respect to the materials used and operationally (less hand pouring). The higher densities have been in NFPA 318 since 2002 and there have not been any documented problems associated with increased densities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed changes are not likely to impact the cost of construction. The proposed changes are primarily operational limits.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal appropriately aligns quantity limits in a single fabrication area with NFPA 418. (Vote: 14-0)

Final Hearing Results

F162-21	AS

F186-21 Part II

Original Proposal

IBC: 306.2, 306.3, 311.2, 311.3

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 306
FACTORY GROUP F

Revise as follows:

306.2 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft (manufacturing, not to include repair)
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages: over ~~16-percent~~ 20 percent alcohol content
- Bicycles
- Boats
- Brooms or brushes
- Business machines
- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing
- Construction and agricultural machinery
- Disinfectants
- Dry cleaning and dyeing
- Electric generation plants
- Electronics
- Energy storage systems (ESS) in dedicated use buildings
- Engines (including rebuilding)
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m^2) in area
- Furniture
- Hemp products
- Jute products
- Laundries
- Leather products
- Machinery
- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)

- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Water/sewer treatment facilities
- Wood; distillation
- Woodworking (cabinet)

306.3 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages: up to and including ~~16-percent~~ 20 percent alcohol content
- *Brick* and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- Metal products (fabrication and assembly)

SECTION 311
STORAGE GROUP S

Revise as follows:

311.2 Moderate-hazard storage, Group S-1. Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

- *Aerosol products*, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over ~~16-percent~~ 20 percent alcohol content
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)

- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle *repair garages* complying with the maximum allowable quantities of *hazardous materials* specified in Table 307.1(1) (see Section 406.8)
- Photo engravings
- Resilient flooring
- *Self-service storage facility* (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

311.3 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic *trim*, such as knobs, handles or film wrapping. Group S-2 storage uses shall include, but not be limited to, storage of the following:

- Asbestos
- Beverages up to and including ~~16-percent~~ 20 percent alcohol
- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors
- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- *Gypsum board*
- Inert pigments
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and *trim*
- Metal parts
- Metals
- Mirrors
- Oil-filled and other types of distribution transformers
- Public parking garages, open or enclosed
- Porcelain and pottery

- Stoves
- Talc and soapstones
- Washers and dryers

Reason: This proposal provides guidance for storage and associated fire protection of alcoholic beverages both in warehouse and in small distillery facilities.
One of the conceptual changes is the threshold at which the percentage of alcohol results in a higher classification of hazard. Traditionally, beverages with an alcohol content greater than 16% were considered to present a higher level of hazard and were therefore placed into Group F-1 for manufacturing and packaging and Group S-1 for storage. Recent testing by FM Global demonstrates that the 16% threshold was too conservative and the threshold is being revised to 20%. Even recent revisions to Ch 32 list beverages in glass or ceramic containers with up to 20% alcohol content as a Class I commodity. The alcohol content does not raise the flammability of the liquid to an extent where additional levels of protection are necessary, and for the most part can be considered nonflammable or noncombustible. As a result, the manufacturing, packaging and storage of beverages with an alcohol content up to 20% will be classified as Group F-2 or S-2 as appropriate. This results in revisions to IBC Chapter 3 and the IFC occupancy definitions in Chapter 2.

The fire protection section provides specific sprinkler system design criteria. The requirements are based on the storage configuration:

- Palletized storage in Section 4005.1
- Rack storage in Section 4005.2

Palletized storage is then provided with design options in Section 4005.1.3:

- Provide draft curtains along the loading aisles
- Provide trench drains along each side of the loading aisles
- Provide straps to secure the barrels to the pallet
- There is a 4th option, which is to not provide a loading aisle at all. As stated in the charging sentence "palletized storage provided with a defined loading aisle..." In other words, the building or room is solid storage; it will have walkways to access the barrels but will not have a forklift loading aisle.

Each of these three designs provides a method of mitigating the spread of liquid or fire during a fire incident. These three protection features are again reference in Table 4005.1.4, and have an impact on the fire sprinkler system design.

The fire sprinkler design criteria is core of this code change. Table 4005.1.4 provides criteria for sprinkler system densities, storage heights and sprinkler selection. This design criteria is based on full-scale fire testing conducted by FM Global and presented in FM Data Sheet 7-29.

Section 4005.1.4 provides for a reduced level of sprinkler protection. Because of reduced level of protection, this section is limited to facilities no greater than 7,500 square feet and with a ceiling height of no more than 24 feet. The intent of this reduction is to allow the small distilleries with a reasonable level of protection based on the reduced fire load per square foot and limited size.

Rack storage is covered in Section 4005.2. This section contains specific requirements again based on storage method:

- Barrels stored on their side
- Barrels stored on-end

The difference in configuration results in different sprinkler design criteria in Table 4005.2.3.6. Rack storage is allowed up to 33 feet in height. Figures have been included to depict the in-rack sprinkler locations.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Bibliography: FM Global Property Loss Prevention Data Sheet 7-29, Ignitable Liquid Storage in Portable Containers, October 2020
Factory Mutual Insurance Company, Johnson, RI

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Chapter 40 of the Fire Code already requires an approved fire sprinkler system for new distilleries and storage facilities for distilled spirits. This code change does not increase that requirement but will provide guidance and consistency in how jurisdictions apply the fire sprinkler requirement.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved for S-1 and F-1 occupancies and the alcohol content of beverages as providing consistency with other provisions in the IBC and IFC, including IFC Table 3203.8. (Vote: 14-0)

Final Hearing Results

F186-21 Part II	AS

F191-21

Original Proposal

IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(2), TABLE 5003.1.1(3), TABLE 5003.1.1(4); IBC: TABLE 307.1(1), TABLE 307.1(2)

Proponents: Tanner Fairrington, Medford Fire-Rescue, Medford Fire-Rescue

2021 International Building Code

Revise as follows:

TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	SeeNote q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fiber[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled[o]		(1,000)			(1,000)			(200)	
Combustible liquid[c, i]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, l]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000[d,e]	NA	NA	1,000[d,e]	NA	NA
	Liquefied			(150)[d,e]	NA		(150)[d,e]	NA		
Flammable liquid[c]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[k]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d,e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d,e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
	2	H-3	$50^{d, e}$	$(50)^{d, e}$	$750^{d, e}$	50^{d}	$(50)^{d}$	$750^{d, e}$	10^{d}	$(10)^{d}$
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	$5^{d, e}$	$(5)^{d, e}$	NA	5^{d}	$(5)^{d}$	NA	1^{d}	$(1)^{d}$
	2	H-3	$50^{d, e}$	$(50)^{d, e}$		50^{d}	$(50)^{d}$		10^{d}	$(10)^{d}$
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed themaximum allowable quantity ~~specified~~ for storage~~.~~, including applicable increases.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the International Fire Code.

j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).

o. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the *International Fire Code*.
3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.
4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.
5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

TABLE 307.1(2) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, f, h, i]

MATERIAL	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
	Solid pounds[d, e]	Liquid gallons (pounds)[d, e]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	Gaseous 810[e]	5,000	500	Gaseous 810[e]	1,000	100
			Liquefied (150)			Liquefied (150)		
Highly Toxic	10	(10)	Gaseous 20[g]	10	(10)	Gaseous 20[g]	3	(3)
			Liquefied (4)[g]			Liquefied (4)[g]		
Toxic	500	(500)	Gaseous 810[e]	500	(500)	Gaseous 810[e]	125	(125)
			Liquefied (150)[e]			Liquefied (150)[e]		

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity ~~specified~~ for storage~~.~~, including applicable increases.

c. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

Reason: The purpose of this clarification is to reduce confusion when applying the footnotes of the maximum allowable quantity (MAQ) per control area tables of the IBC and IFC. This proposal provides consistency between the the IBC and IFC versions, and to clarifies that the intent of footnote b is for the aggregate MAQ for storage and use combined to be based on the tabular value for storage with applicable increases applied. The current language for footnote "b" of IFC Tables 5003.1.1(1) to (4) indicates the, "...quantity **listed** for storage." while footnote "b" of IBC Tables 307.1(1) & (2) indicates the, "...quantity **specified** for storage." The proposed language removes the terms "listed" and "specified" and adds clarifying language to indicate that the aggregate MAQ for storage and use includes applicable increases. The current language may be misinterpreted to indicate that the aggregate MAQ for storage and use within a control area should be based on the tabular value for storage, without increases applied, which conflicts the allowed increases. For example, the MAQ for a Class IIB Flammable liquid increases from 120 gal to 240 gal in a sprinklered building. For this allowance to occur, the total MAQ's in use in storage must exceed the tabular value for storage. Providing clarity and consistency in the language will help users apply the code correctly.

Bibliography: 2021 International Fire Code
2021 International Building Code

2018 International Fire Code and Commentary

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction should not increase, and may decrease as a benefit of the clarification.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal clarifies the application of the maximum allowable quantity increases and allowable aggregate quantities. These revisions also provides more consistency in requirements between the IBC and IFC. (Vote: 14-0)

Final Hearing Results

F191-21 AS

F192-21

Original Proposal

IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(3), 5003.8.3.5, 5003.8.3.5.4 (New), 5003.11, 5003.11.1, 5003.11.2, 5003.11.3, 5003.11.3.1, 5003.11.3.2, 5003.11.3.3, 5003.11.3.4, 5003.11.3.5, 5003.11.3.7, 5003.11.3.6, 5003.11.3.8, 5003.11.3.9, 5003.11.3.10, 5003.11.3.11, 5003.11.2 (New), TABLE 5003.11.2 (New), 5003.11.2.1 (New); IBC: TABLE 307.1(1), [F] 414.2.5, TABLE 414.2.5(3) (New), 414.2.5.4 (New)

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

TABLE 307.1(1)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B(High BV)[r]				1,000[d,e]			1,000[d,e]		
	1B (Low BV)[r]				162,500[d,e]			162,500[d,e]		
	Liquefied				NA			NA		
	1A and 1B(High BV)[r]			(150)[d,e]			(150)[d,e]			
	1B (Low BV)[r]			(10,000)[d,e]			(10,000)[d,e]			

a. For use of control areas, see Section 414.2.

b The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the International Fire Code.

j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(

o. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:
   1. Liquid or gaseous fuel in fuel tanks on vehicles.
   2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the International Fire Code.
   3. Gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code.
   4. Liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code.
   5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

r. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

[F] 414.2.5 Hazardous material in Group M display and storage areas and in Group S storage areas. *Hazardous materials* located in Group M and Group S occupancies shall be in accordance with Sections 414.2.5.1 through ~~414.2.5.3~~ 414.2.5.4.

Add new text as follows:

TABLE 414.2.5(3) MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA [a]

FLAMMABLE GAS CATEGORY	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
	Sprinklered in Accordance with Note b	Nonsprinklered
Category 1B (Low BV)[e] Gaseous Liquefied	390,000 cu. ft. 40,000 lbs.[c]	195,000 cu. ft. 20,000 lbs.

For SI: 1 pound = 0.454 kg, 1 cu. ft. = 0.028 m3

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. The building shall be equipped throughout with an approved automatic sprinkler system with minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.

c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.

d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

414.2.5.4 Flammable gas. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single *control area* of a Group M occupancy or stored in a single*control area* of a Group S occupancy is allowed to exceed the *maximum allowable quantities per control area*specified in Table 307.1(1) without classifying the building or use as a Group H occupancy, provided the materials are stored and displayed in accordance with the *International Fire Code* and quantities do not exceed the amounts specified in Table 414.2.5(3).

Reason: This change coordinates the requirements for flammable gas with the change in definition to “flammable gas.” The change in definition results in two categories of flammable gas, Category 1A and Category 1B. The existing requirements in the code are based on Category 1A flammable gases. As a result, new requirements had to be developed to regulate Category 1B flammable gases. It should be noted that there is a distinction between Category 1B flammable gas based on the burning velocity. The research on this code change is based on a burning velocity of 3.9 in/s (10 cm/s) or less. Higher burning velocity Category 1B flammable gases are not commercially available, hence there is no means of evaluating their performance. The changes to the table for the higher allowable quantities are for the Category 1B low burning velocity flammable gases. There is no change to the Category 1B high burning velocity flammable gases.

A change is necessary to Tables 5003.1.1(1) and 5003.1.1(3) regarding the maximum allowable quantities for control area. The approach that was taken is similar to the approach used in the code for other hazardous materials that have different classes or categories based on the hazard level of the material. The current requirements in the tables will continue to apply to Category 1A flammable gases. This requires the addition of the words “Category 1A and Category 1B (High BV)” to be added in front of the term “flammable gas.” The new requirements for "Category 1B (Low BV)" flammable gases are based on a comparative analysis of the hazard of these flammable gases. The approach was to added limitations in the maximum allowable quantity table with a new section added that specifically regulates the requirements for storage in Use Group M and S. It should be noted that other than Use Group H, the predominant storage location of flammable gases is in Use Group M and S buildings. Section 5803.1.1 of the Fire Code will continue to have restrictions on the storage and use of flammable gases in other Use Groups. A new Section 5003.11.2 and Table 5003.11.2 in the Fire Code will add specific requirements for Use Group M and S. A similar Section 414.2.5.3 will be added to the Building Code. In developing these limitations, a comparison of existing requirements was evaluated for other hazardous materials.

The following table provides a comparison between various flammable gases and flammable liquids:

Item	Liquid or Gas	Gas Cat.	Liquid Class	LFL (LEL)	UFL (UEL)	lb per 10,000 cu ft to LFL	Burning Velocity (in/sec)	Heat of Combustion (Btu/lb)	Min. Ignition Energy (mJ)	Deflagration Index K_G (or K_{ST})[c] (100kPa/s)	Auto Ignition Temp.	Flash Point	Basic MAQ
Propane	Gas	1A		2.1	9.6	5.6	17.9	21,638	0.25	100	920°F		150 lb
Acetylene	Gas	1A		2.5	81		50.4	21,500	0.017	1415	581°F		150 lb
Hydrogen	Gas	1A		4	75	2.1	116.5	60,870	0.019	550	932°F		150 lb
Difluoromethane	Gas	1B		14.4	29.9	192	2.6	4,041	65	11	1,198°F		?
2,3,3,3-tetrafluoro-1-propene	Gas	1B		6.2	12.3	188	0.6	4,601	>1000	8	761°F		?
R454B	Gas	1B		11.8	21.5	880	2.5	4,319	100-300		928°F		?
Trans-1,3,3,3-tetrafluoro-1-propene	Gas	2		Note a	Note a	188	0.5	4,601	62,500	9	694°F		Unlimited
Ammonia	Gas	2		16.7	28	292[b]	2.8	8,020	100-300	10	1,204°F		Unlimited
Gasoline	Liquid		IB	1.4	7.6	NG[d]	15	20,400	0.8		536°F	-45°F	120 gallons (756 lb)
Propyl Alcohol	Liquid		IC	2.1	13.5	NG[d]	19.6	13,192	0.65		700°F	77°F	120 gallons (809 lb)
Kerosene	Liquid		II	0.7	5.0	NG[d]	15.7	19,862	20		428°F	110-150°F	120 gallons (816 lb)
Diesel (2-D)	Liquid		II	0.6	7.5	NG[d]		18,900			410°F	126-205°F	120 gallons (816 lb)
Linseed Oil	Liquid		IIIA	-	-	NG[d]		16,800			650°F	200°F	330 gallons (2,558 lb)
Ethylene Glycol	Liquid		IIIB	3.2	15.2	NG[d]	15.7	7,297	1.2		770°F	232°F	13,200 gallons (122,232 lb)
Olive Oil	Liquid		IIIB	-	-	NG[d]	7.8	16,663			815°F	437°F	13,200 gallons (100,452 lb)

Note a. No LFL and UFL at 20°C, flame begins at 28°C, classified as flammable refrigerant A2L when used as a refrigerant.

Note b. Ammonia is toxic at 0.56 pounds per 10,000 cubic feet.

Note c. Deflagration index based on NFPA 68. K_G (K_{ST}) is the maximum rate of pressure increase normalized to the volume in which the rate was measured.

Note d. NG is not germane. Any spill can result in ignition. The grouping is not appropriate for comparison purposes.

A survey was conduct by HARDI to determine the amount of refrigerant gas that is stored in facilities today. That information helped to ascertain the quantity of Category 1B Low BV flammable gas that will be stored as Group A2L refrigerant in the near future.

A study from Japan by Tei Saburi, National Institute of Advanced Industrial Science and Technology, indicates that Category 1B (Low BV) flammable gases are most closely aligned with Category 2 flammable gases. As the chart indicates, Category 2 flammable gas has never been regulated in the MAQ table. While Category 2 flammable gas is identified as unlimited, this value could not be justified for Category 1B (Low BV) flammable gas. However, when comparing Category 1A to both Category 1B (Low BV) and Category 2 flammable gas, a much higher MAQ can be established for Category 1B (low BV) than Category 1A since the fire hazard from storage is much lower.

An evaluation of various fire tests on Category 1B (Low BV)flammable gas also helped to establish the MAQ. A conservative value of 10,000 pounds of Category 1B (Low BV) flammable gas was established as the maximum for a nonsprinklered control area. Comparing the deflagration index, Category 1B (Low BV) range from 0.5 to 11 percent of the deflagration index of Category 1A flammable gases. The minimum ignition energy varies by as much at 58,000 times. The heat of combustion is between 6 and 19 percent of Category 1B (Low BV). Thus, the value selected is conservative but agreeable to industry.

With the established base maximum, the value for a control area is double for a sprinklered control area. The special requirements for Use Group M and S are also doubled for a nonsprinklered control area. The maximum allowable quantity is double to 40,000 for a sprinklered control area in a Use Group M or S. The sprinklered control area storage maximum can double again when additional floor area is provided in the control area.

The appendices have been updated to correlate with the revisions to the MAQ table.**If the proposal reclassifying 1B Flammable Gases to association with the Group H-3 occupancy classification is successful, Tables 5003.1.1(1) and 307.1(1) will need to be revised so that the "GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED" row says "H-2 or H-3."

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will decrease the cost of construction
This code change reduces the cost of construction. By modifying the maximum allowable quantities for Category 1B flammable gas, the construction costs are lowered. The construction costs for Category 1A flammable gas remain unchanged, neither increased nor decreased in the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved based upon the proponents reason statement and the thorough collaboration between code officials and industry. (Vote: 14-0)

Final Hearing Results

F192-21	AS

F196-21

Original Proposal

IFC: TABLE 5003.11.1; IBC: TABLE 414.2.5(1)

Proponents: William Koffel, Koffel Associates, Inc., Axiall Corporation (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

TABLE 414.2.5(1) MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES OF NONFLAMMABLE SOLIDS AND NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS[d, e, f]

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material[a]	**Class**	**Solids (pounds)**	**Liquids (gallons)**
A. Health-hazard materials—nonflammable and noncombustible solids and liquids			
1. Corrosives[b, c]	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20[b, c]	2[b, c]
3. Toxics[b, c]	Not Applicable	1,000[k]	100
B. Physical-hazard materials—nonflammable and noncombustible solids and liquids			
1. Oxidizers[b, c]	4	Not Allowed	Not Allowed
	3	~~1,350~~ 1,500[g]	~~115~~ 150
	2	2,250[h]	225
	1	18,000[i, j]	1,800[i, j]
2. Unstable (reactives)[b, c]	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water reactives	3[b, c]	550	55
	2[b, c]	1,150	115
	1	Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Hazard categories are as specified in the*International Fire Code*.

b. Maximum allowable quantities shall be increased 100 percent in buildings that are sprinklered in accordance with Section 903.3.1.1. Where Note c also applies, the increase for both notes shall be applied accumulatively.

c. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, in accordance with the *International Fire Code*. Where Note b also applies, the increase for both notes shall be applied accumulatively.

d. See Table 414.2.2 for design and number of control areas.

e. Allowable quantities for other hazardous material categories shall be in accordance with Section 307.

f. Maximum quantities shall be increased 100 percent in outdoor control areas.

g. Maximum amounts shall be increased to 2,250 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.

h. Maximum amounts shall be increased to 4,500 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.

i. The permitted quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

j. Quantities are unlimited in an outdoor control area.

k. Maximum allowable quantities of consumer products shall be increased to 10,000 pounds where individual packages are in the original, sealed containers from the manufacturer and the toxic classification is exclusively based on the LC threshold and no other hazardous materials classifications apply.

Reason: The proposed revision does not change the protection requirements nor the number of containers on a pallet; but rather, allows a small increased capacity per container for solid Class 3 Oxidizers. By allowing the container to be filled, overall there will be fewer plastic containers requiring disposal. The decrease in the number of containers addresses an environmental concern of the retailers and customers. Current practice is to use containers that will hold 60 pounds but the containers are currently only filled to 55 pounds to be consistent with the limit of 1350 pounds. The current practice of 24 containers per pallet equals 1320 pounds. With the increase, the same 24 containers per pallet will now equal 1440 pounds. The change will reduce the number of plastic containers that are discarded by about 9% with no, or minimal, impact on safety. The containers currently used are already UN/DOT approved to contain 60 pounds each of a Class 3 Oxidizer

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed change will have no impact on the cost of construction. By decreasing the number of containers the operational costs related to disposal of the containers will be decreased.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal appropriately aligns with DOT standards and is a very minimal increase in quantity. In addition, allowing larger containers is seen as more environmentally friendly as it facilitates less frequent deliveries. (Vote: 13-0)

Final Hearing Results

F196-21 AS

F197-21

Original Proposal

IFC: 5003.13 (New), 5003.13.1 (New), 5003.13.2 (New), 5003.13.3 (New), 5003.13.4 (New), 5003.13.5 (New); IBC: [F] 307.1
Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[F] 307.1 High-hazard Group H. High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or *health hazard* in quantities in excess of those allowed in *control areas* complying with Section 414, based on the maximum allowable quantity limits for *control areas* set forth in Tables 307.1(1) and 307.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this section, the requirements of Section 415 and the *International Fire Code*. *Hazardous materials* stored, or used on top of roofs or canopies, shall be classified as ~~outdoor~~ rooftop storage or use and shall comply with the *International Fire Code*.

Reason: In the 2009 IBC a change was made indicating that storage of hazardous materials on top of roofs or canopies shall be classified as outdoor storage. However, the outdoor control area provisions in IFC Chapter 50 were never intended to be applied to rooftops and do not provide any guidance for rooftop storage. Additionally, there is nothing that would limit storage to maximum allowable quantities for outdoor control areas provided the storage meets the outdoor storage provisions of material-specific chapters. In many cases, this allows unlimited storage of hazardous materials on top of roofs or canopies. Furthermore, some outdoor storage provisions require distance set-backs to buildings, and it is unclear how that would be applied if the storage is actually on top of a building.
To resolve these conflicts, this proposal creates a new IFC section which immediately follows the outdoor control area section to provide simple, reasonable and safe limitations for rooftop storage consistent with hazardous materials storage concepts in the IFC. In general, roof or canopy top storage is limited to indoor control area MAQs and further adjusted by the number of stories. However,
there are a number of important exceptions to allow for certain limited types of hazardous materials use on roofs or canopies such as refrigeration systems, energy systems, pollution control equipment, closed piping systems, and equipment on unoccupied exterior equipment platforms. A minor change is proposed for IBC 307.1 to change the fire code reference from outdoor storage to rooftop storage for proper coordination.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is primarily clarifying how to address hazardous materials storage on rooftops and will not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal provides a method of addressing rooftop storage which is not currently addressed. There was some concern raised as to how a helipad may be addressed with these new requirements. (Vote: 13-1)

Final Hearing Results

F197-21	AS

P24-21 Part II

Original Proposal

IBC: [P] 1210.3.2, [P] 2903.1.5, [P] 2903.1.4

Proponents: Emma Gonzalez-Laders, NYS DOS Division of Building Standards and Codes, NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); China Clarke, New York State Dept of State, New York State Dept of State (china.clarke@dos.ny.gov)

2021 International Building Code

Revise as follows:

[P] 1210.3.2 Urinal partitions. Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be no less than 30 inches (762 mm).The walls or partitions shall begin at a height not ~~more~~greater than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater. Urinals located in facilities designed for the use of all persons regardless of sex shall be located in an area visually separated from the remainder of the facility or each urinal that is provided shall be located in a stall.

Exceptions:

1. Urinal partitions shall not be required in a single-occupant or family or assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

[P] ~~2903.1.5 Urinal partitions.~~ ~~Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). The walls or partitions shall begin at a height not greater than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.~~

~~**Exceptions:**~~

1. ~~Urinal partitions shall not be required in a single-occupant or family/assisted-use toilet room with a lockable door~~.
2. ~~Toilet rooms located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.~~

[P] ~~2903.1.4 Water closet compartment.~~ ~~Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.~~

~~**Exceptions:**~~

1. ~~Water closet compartments shall not be required in a single-occupant toilet room with a lockable door~~.
2. ~~Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.~~
3. ~~This provision is not applicable to toilet areas located within Group I-3 housing areas~~.

Reason: Sections 1210 and 2902 of the 2021 IBC are complementary to each other, thus, pointers are provided in Sections 2902 and 1210.1. However, their focus and purpose are different.

The purpose of Chapter 29 of the IBC, as stated in the commentary, is “to provide a building with the necessary**number** of plumbing fixtures of a specific type and quality." The commentary explains in great detail the methodology and difficulties in establishing the appropriate number of fixtures for each type of facility. Those difficulties continue beyond the code books as code users attempt to establish the appropriate number of fixtures for specific buildings and facilities. Much clarification is still needed in this section to enable users to make the appropriate determination.

On the other hand, and also according to the commentary, "the purpose of Chapter 12 is to establish minimum conditions for the **interior environment** of a building." Conditions that include not only the physical but also the psychological needs of the occupants, including space perception and privacy.

In keeping with that distinction, this proposal seeks to maintain issues pertaining to the interior environment of toilet facilities in Chapter 12 and to streamline Section 2902 to include only those requirements that address the calculation and the distribution of the number and type of plumbing fixtures required.

Also, in response to public comment received from design professionals, this proposal seeks to resolve the practical challenges and misuse that results from placing urinals in stalls and to remove unnecessarily repetitive language. Specifically, and in summary, this proposal seeks to:

1. Relocate the privacy requirements for urinals from exception2 in 2902.1.1 to Section 1210.3.2 of the 2021 IBC.
2. Relocate the performance language to accomplish privacy for urinals from exception 6 in Section 2902.2 to Section 1210.3.2 of the 2021 IBC.
3. Modify Section 1210.3.2 by incorporating the differences in language that were made to Section 2903.1.5 of the 2021 IBC in the last code cycle.
4. Since Section 2903.1.4 pertaining to privacy for water closets is a duplicate of Section 1210.3.1 and Section 2901.1 already includes a pointer to Section 1210, to remove the duplicate section in Chapter 29 of the 2021 IBC.
5. Since Section 2903.1.5 pertaining to privacy for urinals is a duplicate of Section 1210.3.2 and Section 2901.1 already includes a pointer to Section 1210, to remove the duplicate section in Chapter 29 of the 2021 IBC.

Sections 2903.1.4 and 2903.1.5 were modified by public comment during the last code cycle as Code Change No: G133-18. According to the proponent's justification, the proposal intended to bring *"language from the IPC into the IBC where designers that utilize the IBC can find this information more readily. [since] Most architectural firms do not have an IPC in their office."* However, those provisions already existed in the IBC and adding them to Chapter 29 was unnecessary.

This proposal neither introduces new nor eliminates existing language or code requirements. It seeks instead to consolidate all privacy provisions into one place (Chapter 12) and to ensure that the provisions included in Chapter 29 are consistent with the stated Scope of the Chapter.

Bibliography: Code Change Proposal G133-18 as Modified by Public Comment. Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC; David Collins.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal neither adds nor subtracts code requirements and simply re-organizes existing provisions and deletes duplicate provisions within the IBC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal consolidates the requirement and reduces words in the code. (14-0)

Final Hearing Results

P24-21 Part II AS

P37-21 Part II

Original Proposal

IBC: 1210.2.3 (New)

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Adult Changing Table Committee (jbengineer@aol.com)

2021 International Building Code

Add new text as follows:

1210.2.3 Adult changing table surround. Walls and partitions within 2 feet (610 mm) of the adult changing table shall have a smooth, hard, nonabsorbent surface, to a height of not less than 72 inches (1829 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture.

Reason: The Adult Changing Table Committee of ICC A117.1 developed this code change to address the installation of adult changing stations that are installed on a voluntary basis. There is no mandate within this code change. A companion code change being proposed to Chapter 11 of the Building Code would mandate adult changing stations in certain buildings. This proposed change is consistent with the proposed change to mandate adult changing stations. This proposal will supplement the requirements being proposed to Chapter 11. However, this proposed change can also stand on its own if the proposed change to Chapter 11 is not accepted. If this change is accepted, Chapter 29 of the Building Code would be correlated with the addition of the requirements to the existing sections. If an adult changing station is installed, this code change provides the requirements for public access, cleanliness, and sanitation. The access to an adult changing station is outlined in the first section which lists the rooms in which an adult changing station can be installed. The first two options are obvious in that they would be installed in an individual toilet or bathing room. The third option would allow the changing station to be installed in a men's or ladies room or all gender toilet room having multiple fixtures. Privacy requirements are specified to allow the adult diaper changing to take place out of public view. The fourth option would be a separate room similar to a lactating room in a commercial building or nurses station in a school.
The initial sanitation requirements are specified in the proposed new section 1210.2.3. This section would require surround material similar to the requirement for urinals. It would provide a surface that is readily cleanable and not impacted by moisture.

Every toilet or bathing room has a lavatory. The new requirement would stipulate that when an adult changing station is installed in a privacy compartment or separate room a lavatory would be required for that room to allow for cleanup during and after diaper changing. If there is a separate room without plumbing located in the close proximity, an alcohol-based hand sanitizer dispenser could be used as a substitute for a lavatory.

Since the adult changing station involves the changing of adult diapers, a waste receptacle is required to dispose of the diaper. To minimize the odor from the diaper, the waste receptacle is required to be self-closing. While the Committee considered mandating ventilation for the waste receptacle, it was decided to at a minimum require self closing.

A floor drain is also required to facilitate the washing of the area in the event of an accident during the diaper changing operation. While floor drains are common in toilet rooms and bathing rooms, the Plumbing Code does not mandate the fixture. This section would result in mandating the floor drain when an adult changing station is installed.

It is intended that Section 1210.2.3 be scoped to the IPC committee.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is adding optional requirements if someone choses to install an adult changing station. There are no mandates for such an installation in this change. As such, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The part about "within 2 feet" doesn't indicate which direction. Is it horiontally? (8-6)

Public Comments

Public Comment 1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Adult Changing Table Committee (jbengineer@aol.com); Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, United Spinal Association (mmazz@accessibility-services.com); Lawrence Perry, Lawrence G. Perry, AIA, self (lperryaia@aol.com); Gene Boecker, Code Consultants, Inc., Code Consultants, Inc. (geneb@codeconsultants.com); Laurel Wright, NCDOI/OSFM - Retired, self (lwwright8481@icloud.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1210.2.3 Adult changing table surround . Walls and partitions within 2 feet (610 mm) measured horizontally from each end of the adult changing table and to a height of not less than 72 inches (1829 mm) above the floorshall have a smooth, hard, nonabsorbent surface, ~~to a height of not less than 72 inches (1829 mm) above the floor,~~ and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture.

Commenter's Reason: The Plumbing code committee wanted clearer language for where the nonabsorbent surface would be provided. This public comment addresses that concern.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This change is only a clarification of the original intent.

Final Hearing Results

P37-21 Part II	AMPC1