RB5-22

Original Proposal

IRC: R101.2
Proponents: Stephen Thomas, Shums Coda Associates, Colorado Chapter ICC (sthomas@coloradocode.net)

2021 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of 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* not more than three stories above *grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care facility with five or fewer persons receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer ~~persons~~ children receiving care ~~that are~~ within a ~~single-family~~ dwelling unit.

Reason: This proposal is designed to provide consistent language between the IBC and the IRC regarding small day care facilities. IBC Section 305.2.3 permits a day care facility within a dwelling unit to comply with the IRC where there ae five or fewer children receiving day care. However, there is no scoping in the IRC for this type of use. The cross references were added in the 2018 IBC but we missed the day care provision and just made a general comment for persons receiving care. We no longer need that language since we are addressing each type of care that the IBC permits to comply with the IRC in the different uses in the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a clarification and does not change any technical provisions.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R101.2Scope.
The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of 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* not more than three stories above *grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.

3. A care facility with five or fewer persons receiving custodial care within a*dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a*dwelling unit*.
5. A day care facility for five or fewer children receiving care within a dwelling unit.
6. <u>A care facility for five or fewer persons receiving care within a dwelling unit</u>.

Committee Reason: The modification was approved because it restored the current exception 5 with the additional modification of allowing for for adult day care to be located within a townhouse or a single family home. The original proposal was approved because it specifically addressed child day care and allowed for child day care to be located within a townhouse or single family home. (Vote: 10-0)

Public Comments

Public Comment 1

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of 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* not more than three stories above *grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in townhouses and complying with the requirements of Section 508.5 of the International Building Code.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care facility with five or fewer persons receiving custodial care within a*dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a*dwelling unit*.
5. A day care facility for five or fewer ~~children~~ <u>persons of any age</u> receiving care within a dwelling unit.
6. ~~A care facility for five or fewer persons receiving care within a dwelling unit~~.

Commenter's Reason: The original proposal was too limiting as it said day care was only for children. The IBC Sections 308.5, 308.5.4 and 310.4.1 allow for day care for any age. While the BCAC agrees this should be indicated as 'day' care, adult day care should also be permitted.
The proponent put in a floor modification to add the current exception 5 back into the list of exceptions as a new exception 6. That would be redundant. The clarification can be in one exception.

2021 IBC

308.5 Institutional Group I-4, <u>day</u> care facilities. Institutional Group I-4 occupancy shall include buildings and structures occupied by more than five persons <u>of any age</u> who receive custodial care for fewer than 24 hours per day by persons other than parents or guardians; relatives by blood, marriage or adoption; and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

Adult day care

Child day care308.5.4 Five or fewer persons receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.

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.

It should be noted that Section AY101.1.1 of RB314-22 AS also contains this list. BCAC would support coordination between those two sections as code correlation.

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, 2021 and 2022 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 net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This change is a clarification and does not change any technical provisions.

Final Hearing Results

RB5-22	AMPC1

RB7-22

Original Proposal

IRC: R102.7.1, R102.7.2 (New), SECTION 202, SECTION 202 (New), CHAPTER 44 (New), APPENDIX AJ

Proponents: Sue Coffman, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (sue.coffman@cityoftacoma.org); Hoyt Jeter, City of Tacoma, WABO TCD (hjeter@cityoftacoma.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Micah Chappell, Washington Association of Building Officials Technical Code Development Committee, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R102.7.1 Additions~~, alterations or repairs~~ or relocations. *Additions~~, alterations~~* ~~or repairs~~ to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions~~, alterations,~~* ~~repairs~~ and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition~~, alteration~~* ~~or~~ *~~repair~~* or relocation. An existing building together with its *additions* shall comply with the height limits of this code.~~Where the~~ *~~alteration~~* ~~causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the~~ *~~International Existing Building Code~~* ~~shall apply.~~

Add new text as follows:

R102.7.2 Repairs, renovations, alterations, or reconstructions. Repairs, renovations, alterations, or reconstructions shall conform to the requirements of the provisions of Chapter 44. Where the renovation, alteration, or reconstruction causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

Revise as follows:

[RB] ALTERATION. Any construction, reconfiguration, retrofit or renovation to an existing structure other than *repair* or *addition* that requires a *permit*. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves ~~an~~ a reconfiguration or extension, *addition*, installation, or change to the equipment or arrangement, type or purpose of the original installation that requires a *permit*. For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

CATEGORIES OF WORK. The nature and extent of construction work undertaken in an existing building, which include repair, renovation, alteration, and reconstruction.

DANGEROUS. Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.

MATERIALS AND METHODS REQUIREMENTS. Those requirements in this code that specify material standards; details of installation and connection; joints, penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.

RECONSTRUCTION. The reconfiguration of a space that affects an exit, a renovation or alteration where the work area is not permitted to be occupied because existing means-of-egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive alterations.

REHABILITATION. Any repair, renovation, alteration or reconstruction work undertaken in an existing building.

RENOVATION. The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are considered refinishing for the purposes of this definition, and are not renovation.

Revise as follows:

[RB] REPAIR. The r~~econstruction, replacement~~ patching, restoration, minor replacement, or renewal of ~~any part~~ materials, elements, components, equipment, or fixtures of an existing building for the purpose of~~its maintenance~~ maintaining those materials, elements, components, equipment, or fixtures in good or sound condition, or to correct damage.
For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

WORK AREA. That portion of a building affected by any renovation, alteration or reconstruction work as initially intended by the owner and indicated as such in the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the owner is specifically required by the provisions for the renovation, alteration or reconstruction.

Add new text as follows:

CHAPTER 44 EXISTING BUILDINGS AND STRUCTURES

SECTION R4401 SCOPE

R4401.1 General. The specific provisions in this chapter shall apply to the repair, renovation, alteration, and reconstruction of existing buildings and structures. These standards shall apply where construction does not fully comply with construction standards in this code for new construction.

SECTION R4402 CATEGORIES OF WORK

R4402.1 General. Work in existing buildings and structures shall be categorized as repair, renovation, alteration, and reconstruction, and comply with the requirements in this chapter.
Work of more than one category shall be part of a single work project and related work permitted within a 12-month period shall be considered a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.

SECTION R4403 COMPLIANCE

R4403.1 General. Regardless of the category of work being performed, the work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously approved alternative arrangements than it was before the work was undertaken.

R4403.2 Requirements by category of work. Repairs shall conform with the requirements in Section R4405. Renovations shall conform to the requirements of Section R4406. Alterations shall conform to the requirements of Section 4407 and the requirements for renovations. Reconstructions shall conform to the requirements of Section R4408 and the requirements of alterations and renovations.

R4403.3 Smoke alarms. Regardless of the category of work, smoke alarms shall be provided where required by Section R314.2.2.

R4403.4 Replacement windows. Regardless of the category of work, where an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections R4403.4.1 through R4403.4.3, as applicable.

R4403.4.1 Energy efficiency. Replacement windows shall comply with the requirements of Chapter 11.

R4403.4.2 Safety glazing. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

R4403.4.3 Replacement windows for emergency escape and rescue openings. Replacement windows for emergency escape and rescue openings shall comply with Section R310.5.

4403.4.4 Window control devices. Window opening control devices and fall prevention devices shall be installed compliant with the requirements in R312.2 where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
   - 2.1 The window replacement includes replacement of the sash and the frame.
   - 2.2. The window replacement includes the sash only when the existing frame remains.
3. The bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

R4403.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2(1) shall be subject to the provisions of Section R105.3.1.1.

R4403.6 Features exceeding code requirements. Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of approved alternative arrangements or deemed by the building official to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.

SECTION R4404
EVALUATION OF AN EXISTING BUILDING

R4404.1 General. The building official shall have authority to require an existing building to be investigated and evaluated by a registered design professional in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
   - 1.1. Field surveys.
   - 1.2. Tests (nondestructive and destructive).
   - 1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing and extensive reconstruction shall not be required to be evaluated.

SECTION R4405
REPAIRS

R4405.1 Materials and methods. Except as otherwise required herein, repairs shall be done using like materials or methods permitted by this code for new construction.

R4405.1.1 Hazardous materials. Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

R4405.1.2 Plumbing materials and supplies. The following plumbing materials and supplies shall not be used:

1. All-purpose solvent cement, unless listed for the specific application.
2. Flexible traps and tailpieces, unless listed for the specific application.
3. Solder having more than 0.2-percent lead in the repair of potable water systems.

R4405.2 Water closets. Where any water closet is replaced with a newlymanufactured water closet, the replacement water closet shall comply with the requirements of Section P2903.2.

R4405.3 Electrical. Repair or replacement of existing electrical wiring and equipment undergoing repair with like material shall be permitted.

Exceptions:

1. Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.
2. Plug fuses of the Edison-base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.
3. For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuity, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.

R4405.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

SECTION R4406
RENOVATIONS

R4406.1 Materials and methods. Except as otherwise required herein, renovations shall comply with the materials and methods requirements of this code for new construction.

R4406.2 Door and window dimensions. Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.

R4406.3 Interior finish. Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements of Section R302.9.

R4406.4 Structural. Unreinforced masonry buildings located in Seismic Design Category D2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing permit is issued. Such parapet bracing and wall anchors shall be of an approved design.

SECTION R4407
ALTERATIONS

R4407.1 Newly constructed elements. Newly constructed elements, components and systems shall comply with the requirements of this code for new construction.

Exceptions:

1. Added openable windows are not required to comply with the light and ventilation requirements of Section R303.
2. Newly installed electrical equipment shall comply with the requirements of Section 4508.5

R4407.2 Nonconformities. Alterations shall not increase the extent of noncompliance with the requirements of Section 4408 or create nonconformity to those requirements that did not previously exist.

R4407.3 Extensive alterations. Where the total area of all of the work areas included in an*alteration* exceeds 50 percent of the area of the dwelling unit, the work shall be considered to be a reconstruction and shall comply with the requirements of Section 4408.

Exception: Work areas in which the alteration work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

R4407.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code for new construction.

R4407.5 Electrical equipment and wiring. Electrical equipment and wiring in alterations shall comply with Sections R4407.5.1 through R4407.5.5.

R4407.5.1 Materials and methods. Newly installed electrical equipment and wiring relating to work done in any work area shall comply with the materials and methods requirements of Chapters 34 through 43.

Exception: Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.

R4407.5.2 Electrical service. Service to the dwelling unit shall not be less than 100 ampere, three-wire capacity and service equipment shall be dead front having no live parts exposed that could allow accidental contact. Type “S” fuses shall be installed where fused equipment is used.

Exception: Existing service of 60 ampere, three-wire capacity, and feeders of 30 ampere or larger two- or three-wire capacity shall be accepted if adequate for the electrical load being served.

R4407.5.3 Additional electrical requirements. Where the work area includes any of the following areas within a dwelling unit, the requirements of Sections R4407.5.3.1 through R4407.5.3.5 shall apply.

R4407.5.3.1 Enclosed areas. Enclosed areas other than closets, kitchens, basements, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

R4407.5.3.2 Kitchen and laundry areas. Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

R4407.5.3.3 Ground-fault circuit interruption. Ground-fault circuit interruption shall be provided on newly installed receptacle outlets where required by Chapters 34 through 43.

R4407.5.3.4 Lighting outlets. Not less than one lighting outlet shall be provided in every bathroom, hallway, stairway, attached garage and detached garage with electric power to illuminate outdoor entrances and exits, and in utility rooms and basements where these spaces are used for storage or contain equipment requiring service.

R4407.5.3.5 Clearance. Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

R4407.6 Ventilation. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with *ventilation* in accordance with Section R303.

R4407.7 Ceiling height. Habitable spaces created in existing basements shall have ceiling heights of not less than 6 foot 8 inches (2032mm), except that the ceiling height at obstructions shall be not less than 6 foot 4 inches (1930 mm) from the basement or attic floor. Existing finished ceiling heights in nonhabitable basements shall not be reduced.

R4407.8 Stairs. Except as noted otherwise herein, stairs shall comply with the requirements of Section R311.

R4407.8.1 Stair width. Existing basement stairs and handrails not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing handrails.

R4407.8.2 Stair headroom. Headroom height on existing basement stairs being altered or modified shall not be reduced below the existing stairway finished headroom. Existing basement stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

R4407.8.3 Stair landing. Landings serving existing basement stairs being altered or modified shall not be reduced below the existing stairway landing depth and width. Existing basement stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

SECTION R4408
RECONSTRUCTION

R4408.1 Materials and methods. Except as otherwise required herein, reconstruction shall be done using materials or methods permitted by this code for new construction.

R4408.2 Stairways. Stairways within the work area shall be provided with illumination in accordance with Section R303.6.

R4408.3 Handrails. Every required exit stairway that has four or more risers, is part of the means of egress for any work area, and does not have handrails, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.

R4408.4 Guards. Every open portion of a stair, landing or balcony that is more than 30 inches (762 mm) above the floor or grade below, is part of the egress path for any work area, and does not have guards, or in which the existing guards are judged to be in danger of collapsing, shall be provided with guards designed and installed in accordance with Section R312.

R4408.5 Wall and ceiling finish. The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.

R4408.6 Separation walls. Where the work area is in an attached dwelling unit, walls separating dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the dwelling unit that is part of the work area.

Revise as follows:

~~APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES~~
(Delete all of Appendix J)

Reason: This proposed code change deletes Appendix Chapter J of the 2021 IRC and moves most of its provisions into the body of the IRC code as a new chapter 44. Definitions from the appendix chapter are also moved into the body of the code as new definitions, or modified if the definitions already existed in the body of the code.
While there are provisions for existing buildings in the IRC, they are scattered throughout different sections of the code and it is sometimes not clear when certain sections apply. There is also a need for clarity surrounding code standards for existing IRC buildings to provide an understanding of when the International Existing Building Code applies vs individual sections within the body of the code.

This proposal consolidates standards for alterations, renovations, reconstructions and repairs into a single chapter, which is referenced in a new section in Chapter R102.7.1. By moving code requirements for existing buildings into a separate chapter within the body of the code, there are distinct requirements that can be specifically applied to the variations options for modifying an existing IRC building, including repairs, renovations, alterations, and reconstructions. This is also contrasted with additions, to which only new code standards apply and the proposed code specifically addresses additions along with renovations in this section.

In addition to a need for consolidation and clarity of code requirements in the IRC, more reasonable standards are also needed for residential buildings that were built decades ago that potentially have windows, ceiling heights and stairs that don't comply with new code standards.

With many of these spaces potentially already being used for decades as habitable spaces by the homeowner who may not be familiar with building code requirements, the risk of allowing these spaces to be converted to legal habitable space is small. The ability to apply reasonable code standards with a reasonable level of safety gives the homeowner effective use these existing buildings without requiring major reconstruction such as raising the house above the foundation, or other expensive construction techniques that may not add any substantial level of safety to the use of the building.

These proposed provisions also increase the sustainability of our IRC building code because they allows reasonable re-use of buildings. The ability to add additional bedrooms or other habitable spaces to existing buildings enables the homeowner to maximize the use of their home within the same building footprint. This provides additional value to the home without the high cost of new construction.

Although the existing building standards in Appendix J are available as an option for any jurisdiction to adopt, it is a burden to many jurisdictions who have to petition their state building code councils or governing bodies to individually adopt it for their individual jurisdiction. Appendix chapters are therefore infrequently used and most jurisdictions, especially those without a lot capacity for code development, stick to the standard provisions of the state codes and do not adopt optional provisions such as Appendix J. There is a need for the model codes to take the leap and incorporate these requirements into the body of the code, which will therefore be adopted by the states and available to all jurisdictions.

Cost Impact: The code change proposal will decrease the cost of construction
More reasonable standards to allow for existing spaces to be compliant with code requirements will not require extensive costly alterations.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee disapproved this proposal because they believed the option of using IEBC should remain. In addition, the definitions currently in Appendix J were inconsistent and conflicting with the IEBC (e.g. renovation, rehabilitation). The provisions for existing building currently into the code should be relocated to be grouped in one location. Appendix J should be updated, and then moved into the new existing building chapter. (Vote: 10-0)

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); 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

Replace as follows:

2021 International Residential Code

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES

SECTION AJ106 DEFINITIONS

AJ106.1 General. ~~For purposes of this appendix, the~~ The terms used in this appendix, and not provided in Chapter 2 of the *International Residential Code*, are defined as follows:

~~**ALTERATION.** The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment.~~

DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous: ~~Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.~~

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 dislodgement 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.

REHABILITATION. Any work, as described by the categories of work defined herein, undertaken in an existing building.~~Any *repair*, renovation, *alteration* or reconstruction work undertaken in an existing building~~.

~~**REPAIR.** The patching, restoration or minor replacement of materials, elements, components, equipment or fixtures for the purposes of maintaining those materials, elements, components, equipment or fixtures in good or sound condition.~~

WORK AREA. ~~That portion of a building affected by any renovation, *alteration* or reconstruction work as initially intended by the *owner* and indicated as such in the *permit*. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the *owner* is specifically required by these provisions for a renovation, *alteration* or reconstruction.~~ That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.T

SECTION AJ107 REPAIRS

AJ107.1 Materials. Materials used during repairs shall comply with this section. ~~Except as otherwise required herein, work shall be done~~

~~using like materials or materials permitted by this code for new construction.~~

AJ107.1.1 ~~Hazardous materials~~ New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by this code for new construction shall be used. Like materials shall be permitted for *repairs* and *alterations*, provided that *unsafe* conditions are not created. Hazardous materials ~~no longer permitted, such as asbestos and lead-based paint,~~shall not be used where this code would not permit their use in buildings of similar occupancy, purpose, and location.

AJ107.1.2 Existing materials. Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the building official to be *unsafe*.

Commenter's Reason: New language addressing new and existing materials has been included clarifying when new materials have to be used and when materials matching the existing materials are allowed to be used instead.Structural definitions have been deleted where already defined in Chapter 2 of the IRC or revised to match definitions already defined in Chapter 2 of the IEBC.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

https://www.cdpaccess.com/p/public-comment/3547/27869/files/download/3691/RB7-22%20attachment.pdf

- This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Because the main body of the code is the default resource used given the present limitations of Appendix AJ, this proposal with floor modifications and public comments will not increase the cost of construction within the IRC. This is a long overdue cleanup that begins to align the Appendix provisions with the requirements of the main body of the code as they are frequently interpreted and used in the field.

Public Comment 2

Proponents: Ardel Jala, Seattle Dept of Construction & Inspections, Washington Association of Building Officials Technical Code Dev Committee (ardel.jala@seattle.gov); 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

Replace as follows:

2021 International Residential Code

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES

SECTION AJ101 PURPOSE AND INTENT

AJ101.1 General. The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings and structures. ~~These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code.~~ *Repairs, alterations, additions,* and relocation of existing buildings and structures shall comply with the provisions of this code for new construction, except as modified by this appendix.

~~**AJ101.2 Classification of work.** For purposes of this appendix, work in existing buildings shall be classified into the categories of *repair*, renovation, *alteration* and reconstruction. Specific requirements are established for each category of work in these provisions.~~

~~**AJ101.3 Multiple categories of work.** Work of more than one category shall be part of a single work project. Related work permitted within a 12-month period shall be considered to be a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.~~

SECTION AJ102 COMPLIANCE

AJ102.1 General. ~~Regardless of the category of work being performed,~~~~the~~The work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously *approved* alternative arrangements than it was before the work was undertaken.

~~**AJ102.2 Requirements by category of work.** Repairs shall conform to the requirements of Section AJ107. Renovations shall conform to the requirements of Section AJ108. *Alterations* shall conform to the requirements of Section AJ109 and the requirements for renovations. Reconstructions shall conform to the requirements of Section AJ110 and the requirements for *alterations* and renovations~~.

AJ102.2~~**AJ102.3**~~ **Smoke** ~~**detectors**~~ **alarms.** ~~Regardless of the category of work, smoke detectors~~Smoke alarms shall be provided where required by Section R314.2.2.

AJ102.3 Carbon monoxide alarms. Carbon monoxide alarms shall be provided where required by Section R315.2.2.

AJ102.4 Replacement windows. ~~Regardless of the category of work, where~~Where an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections AJ102.4.1 through AJ102.4.4, as applicable.

AJ102.4.1 Energy efficiency. Replacement windows shall comply with the requirements of Chapter 11.

AJ102.4.2 Safety glazing. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

AJ102.4.3 Replacement windows for emergency escape and rescue openings. Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is not part of a change of occupancy.

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

AJ102.4.3.1 ~~**Control**~~**Window opening control devices and fall protection device height.** ~~Emergency escape and rescue openings with w~~Window opening control devices or fall prevention devices shall be located at a height in accordance with Section R310.1.1 or at as low a height as can be installed within the existing clear opening. ~~complying with ASTM F2090, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.~~

AJ102.4.4 Window ~~**control devices**~~ **fall protection.** Window fall protection shall be installed in accordance with Section R312.2. ~~Window opening control devices or fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:~~

1. ~~The window is operable.~~

2. ~~One of the following applies:~~
   2.1. ~~The window replacement includes replacement of the sash and the frame~~.

   2.2. ~~The window replacement includes the sash only when the existing frame remains~~.

3. ~~The bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor~~.

4. ~~The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.~~

5. ~~The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).~~

AJ102.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2 shall be subject to the provisions of Section R105.3.1.1.

AJ102.6 Equivalent alternatives. Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this appendix. These provisions are not intended to prevent the use of any alternative material, alternative design or alternative method of construction not specifically prescribed herein, provided that any alternative has been deemed to be equivalent and its use authorized by the *building official*.

~~**AJ102.7 Other alternatives.** Where compliance with these provisions or with this code as required by these provisions is technically infeasible or would impose disproportionate costs because of construction or dimensional difficulties, the building official shall have the authority to accept alternatives. These alternatives include materials, design features and operational features.~~

AJ102.7~~AJ102.8~~ More restrictive requirements. Buildings or systems in compliance with the requirements of this code for new construction shall not be required to comply with any more restrictive requirement of these provisions.

~~**AJ102.9 Features exceeding code requirements.** Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of *approved* alternative arrangements or deemed by the *building official* to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.~~

SECTION ~~AJ103~~
~~PRELIMINARY MEETING~~

~~**AJ103.1 General.** If a building *permit* is required at the request of the prospective *permit* applicant, the *building official* or his or her designee shall meet with the prospective applicant to discuss plans for any proposed work under these provisions prior to the application for the *permit*. The purpose of this preliminary meeting is for the *building official* to gain an understanding of the prospective applicant's intentions for the proposed work, and to determine, together with the prospective applicant, the specific applicability of these provisions.~~

SECTION ~~AJ104~~
~~EVALUATION OF AN EXISTING BUILDING~~

~~**AJ104.1 General.** The *building official* shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:~~

1. ~~Available documentation of the existing building.~~
    1.1. ~~Field surveys.~~
    1.2. ~~Tests (nondestructive and destructive).~~
    1.3. ~~Laboratory analysis.~~

~~**Exception:** Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.~~

SECTION AJ103~~AJ106~~ DEFINITIONS

AJ103.1~~AJ106.1~~ General. ~~For purposes of this appendix, the terms used are defined as follows:~~ The terms used in this appendix, and not provided in Chapter 2 of the International Residential Code, are defined as follows:

~~**ALTERATION.** The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment~~

~~**CATEGORIES OF WORK.** The nature and extent of construction work undertaken in an existing building. The categories of work covered in this appendix, listed in increasing order of stringency of requirements, are *repair*, renovation, *alteration* and reconstruction.~~

DANGEROUS.
Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:
~~Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.~~

1. The building of 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 dislodgement 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 or other environmental loads when such loads are imminent.

~~**EQUIPMENT OR FIXTURE.** Any plumbing, heating, electrical, ventilating, air-conditioning, refrigerating and fire protection equipment; and elevators, dumb waiters, boilers, pressure vessels, and other mechanical facilities or installations that are related to building services.~~

~~**MATERIALS AND METHODS REQUIREMENTS.** Those requirements in this code that specify material standards; details of installation and connection; joints; penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.~~

~~**RECONSTRUCTION.** The reconfiguration of a space that affects an exit, a renovation or *alteration* where the work area is not permitted to be occupied because existing means-of-egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive *alterations* as defined in Section AJ109.3.~~

~~**REHABILITATION.** Any *repair*, renovation, *alteration* or reconstruction work undertaken in an existing building.~~

~~**RENOVATION.** The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are not considered refinishing for purposes of this definition, and are not renovation.~~

~~**REPAIR.** The patching, restoration or minor replacement of materials, elements, components, equipment or fixtures for the purposes of maintaining those materials, elements, components, equipment or fixtures in good or sound condition.~~

~~**WORK AREA.** That portion of a building affected by any renovation,*alteration* or reconstruction work as initially intended by the *owner* and indicated as such in the *permit*. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the *owner* is specifically required by these provisions for arenovation, *alteration* or reconstruction.~~

SECTION <u>AJ104</u>~~AJ107~~

REPAIRS

<u>**AJ104.1 General.** Repairs shall comply with the applicable provisions of the *International Residential Code* for new construction or as permitted by this appendix.</u>

<u>**AJ104.2**</u>~~**AJ107.1**~~ **Materials.** Except as otherwise required herein, <u>*repairs*</u> ~~work~~ shall be done using like materials or materials permitted by this code for new construction.

<u>**AJ104.2.1**</u>~~**AJ107.1.1**~~ **Hazardous materials.** Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

<u>**AJ104.1.2**</u>~~**AJ107.1.2**~~ **Plumbing materials and supplies.** The following plumbing materials and supplies shall not be used:

1. All-purpose solvent cement, unless *listed* for the specific application.
2. Flexible traps and tailpieces, unless *listed* for the specific application.
3. Solder having more than 0.2-percent lead in the repair of potable water systems.

<u>**AJ104.3**</u>~~**AJ107.2**~~ **Water closets.** Where any water closet is replaced with a newly manufactured water closet, the replacement water closet shall comply with the requirements of Section P2903.2.

<u>**AJ104.4**</u>~~**AJ107.3**~~ **Electrical.** Repair or replacement of existing electrical wiring and equipmen~~tundergoing repair with like material shall be permitted.~~ <u>shall comply with Chapters 34 through 43</u>.

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

1. ~~Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.~~
2. ~~Plug fuses of the Edison-base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.~~
3. ~~For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.~~

SECTION ~~AJ108~~

~~RENOVATIONS~~

~~**AJ108.1 Materials and methods.** The work shall comply with the materials and methods requirements of this code.~~

~~**AJ108.2 Door and window dimensions.** Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.~~

~~**AJ108.3 Interior finish.** Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements~~

~~of Section R302.9.~~

SECTION AJ105~~AJ109~~
ALTERATIONS

AJ105.1 General. *Alterations to* existing buildings shall comply with the provisions of this code for new construction, except as permitted by Sections AJ105.2 through AJ105.8. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. *Alterations* shall not cause the existing building to become less compliant with the provisions of this code for new construction than the existing building was prior to the work.

AJ105.2~~AJ109.1~~ Newly constructed elements. Newly constructed elements, components and systems shall comply with the requirements of this code.

Exceptions:

1. Added openable windows are not required to comply with the light and *ventilation* requirements of Section R303.
2. Newly installed electrical equipment shall comply with the requirements of Section ~~AJ109.5~~ AJ105.5.

AJ105.3~~AJ109.2~~ Nonconformities. The work shall not increase the extent of noncompliance ~~with the requirements of Section AJ110~~, or create nonconformity to those requirements that did not previously exist.

~~**AJ109.3 Extensive alterations.** Where the total area of all of the work areas included in an *alteration* exceeds 50 percent of the area of the *dwelling unit*, the work shall be considered to be a reconstruction and shall comply with the requirements of these provisions for reconstruction work.~~

~~**Exception:** Work areas in which the *alteration* work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.~~

AJ105.4~~AJ109.4~~ Structural. Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this appendix. ~~The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.~~

AJ105.4.1~~AJ108.4 Structural~~ Unreinforced masonry walls. Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

AJ105.5~~AJ109.5~~ Electrical equipment and wiring. Electrical equipment and wiring shall comply with this section.

AJ105.5.1~~AJ109.5.1~~ Materials and methods. Newly installed electrical equipment and wiring relating to work done in any work area, including in newly installed partitions and ceilings, shall comply with the materials and methods requirements of Chapters 34 through 43.

~~**Exception:** Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.~~

AJ105.5.2~~AJ109.5.2~~ Electrical service. Service to the *dwelling unit* shall be not less than 100 ampere, three-wire capacity and service *equipment* shall be dead front having no live parts exposed that could allow accidental contact. Type "S" fuses shall be installed where fused equipment is used.

Exception: Existing service of 60 ampere, three-wire capacity, and feeders of 30 ampere or larger two- or three-wire capacity shall be accepted if adequate for the electrical load being served.

AJ105.5.3~~AJ109.5.3~~ Additional electrical requirements. Where the work area includes any of the following areas within a *dwelling unit*, the requirements of Sections ~~AJ109.5.3.1~~ AJ105.5.3.1 through ~~AJ109.5.3.5~~ AJ105.5.3.5 shall apply.

<u>AJ105.5.3.1</u>~~AJ109.5.3.1~~ Enclosed areas. Enclosed areas other than closets, kitchens, *basements*, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

<u>AJ105.5.3.2</u>~~AJ109.5.3.2~~ Kitchen and laundry areas. Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent <u>branch</u> circuit.

<u>AJ105.5.3.3</u>~~AJ109.5.3.3~~ Ground-fault circuit interruption. Ground-fault circuit interruption shall be provided on newly installed receptacle outlets if required by Chapters 34 through 43.

<u>AJ105.5.3.4</u>~~AJ109.5.3.4~~ Lighting outlets. Not less than one lighting outlet<u> controlled by a listed wall-mounted device</u> shall be provided in every bathroom, hallway, *stairway*, attached garage and detached garage with electric power to illuminate outdoor entrances and exits, and in utility rooms and *basements* where these spaces are used for storage or contain equipment requiring service.<u>The wall-mounted control device shall be located near an entrance to the room.</u>

<u>AJ105.5.3.5</u>~~AJ109.5.3.5~~ Clearance. Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

<u>AJ105.6</u>~~AJ109.6~~ Ventilation. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with *ventilation* in accordance with Section R303.

<u>AJ105.7</u>~~AJ109.7~~ Ceiling height. ~~*Habitable spaces* created in existing *basements* shall have~~ <u>Where a habitable attic or habitable space is created in an existing building,</u> ceiling heights shall not be ~~of not~~ less than 6 feet, 8 inches (2032 mm). ~~, except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the *basement* floor. Existing finished ceiling heights in nonhabitable spaces in *basements* shall not be reduced.~~ <u>Bathrooms, toilet rooms, and laundry rooms shall have a ceiling height of not less than 6 feet 4 inches (1930 mm).</u>

<u>Exceptions:</u>

1. <u>For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm), and not less than 50 percent of the required floor area shall have a ceiling height of not less than 6 feet 8 inches (2134 mm).</u>
2. <u>At beams, girders, ducts, or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.</u>

<u>AJ105.8</u>~~AJ109.8~~ Stairs<u>, handrails, and guards</u>. <u>Stairs, handrails, and guards shall comply with this section</u>.

<u>AJ105.8.1</u>~~AJ109.8.1~~ Stair width. Existing *basement* stairs and *handrails* not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.

<u>AJ105.8.2</u>~~AJ109.8.2~~ Stair headroom. Headroom height on existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

<u>AJ105.8.3</u>~~AJ109.8.3~~ Stair landing. Landings serving existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

<u>AJ105.8.4 Stair treads and riser</u>. <u>An existing stairway shall not be required to comply with Section R311.7.5 where the existing space and construction does not allow a reduction in pitch or slope. Where risers are added to an existing stair, the tread and riser dimension of the added risers shall match the existing stair.</u>

<u>AJ105.8.5 Stairway Illumination</u>. <u>Stairways within the work area shall be provided with illumination in accordance with Section R303.6</u>.

AJ105.8.6 Handrails and Guards. If a stair or any portion of a stair is altered, a handrail and guard, where required, shall be provided in accordance with Section R311 and R312.

SECTION AJ106
ADDITIONS

AJ106.1 General. Where the existing building with an addition is within the scope of the International Residential Code, the addition shall comply with the applicable provisions of the International Residential Code for new construction or as permitted by this appendix.

SECTION AJ107
RELOCATED BUILDINGS

AJ107.1 General. Residential buildings or structures moved into or within the jurisdiction are not required to comply with the requirements for new construction under the International Residential Code provided they comply with all of the following conditions:

1. The building shall be safe for human occupancy as determined by the International Fire Code and the International Property Maintenance Code.
2. Any repair, alteration or change of use undertaken within the relocated structure shall comply with the requirements of this code applicable to the work being performed.
3. Any field fabricated elements shall comply with the applicable requirements of this code.

~~SECTION AJ110~~
~~RECONSTRUCTION~~

~~**AJ110.1 Stairways, handrails and guards.**~~

~~**AJ110.1.1 Stairways.** *Stairways* within the work area shall be provided with illumination in accordance with Section R303.7.~~

~~**AJ110.1.2 Handrails.** Every required exit *stairway* that has four or more risers, is part of the means of egress for any work area, and is not provided with not fewer than one *handrail*, or in which the existing *handrails* are judged to be in danger of collapsing, shall be provided with *handrails* designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.~~

~~**AJ110.1.3 Guards.** Every open portion of a *stair*, landing or balcony that is more than 30 inches (762 mm) above the floor or *grade* below, is part of the egress path for any work area, and does not have *guards*, or in which the existing *guards* are judged to be in danger of collapsing, shall be provided with *guards* designed and installed in accordance with Section R312.~~

~~**AJ110.2 Wall and ceiling finish.** The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an *approved* fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.~~

~~**AJ110.3 Separation walls.** Where the work area is in an attached *dwelling unit*, walls separating *dwelling units* that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the *dwelling unit* that is part of the work area.~~

~~**AJ110.4 Ceiling height.** *Habitable spaces* created in existing *basements* shall have ceiling heights of not less than 6 feet, 8 inches (2032 mm), except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the *basement* floor. Existing finished ceiling heights in nonhabitable spaces in *basements* shall not be reduced.~~

SECTION ~~AJ111~~ AJ108
REFERENCED STANDARDS

~~AJ111.1~~ AJ108.1 ~~General~~. See Table ~~AJ111.1~~ AJ108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

TABLE ~~AJ111.1~~ AJ108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTION HEREIN REFERENCED
ASTM F2090–17	*Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms*	AJ102.4.3, AJ102.4.4
IEBC–~~21~~ 24	*International Existing Building Code*	AJ102.6
IFC - 24	*International Fire Code*	AJ107.1
IPMC-24	*International Property Maintenance Code*	AJ107.1

Commenter's Reason: This public comment is being submitted in response to the direction given by the IRC-Building Committee to improve Appendix AJ before trying to move its provisions into the body of the code. To that end, we have taken many of the provisions from our originally-proposed Chapter 44 and incorporated them into Appendix AJ. Along the way, we have cleaned up the appendix by deleting unfamiliar terms in the appendix in favor of more familiar terms, clarifying the scope, and updating provisions that have not been updated since the appendix was created. This comprehensive public comment results in an appendix that is a clearer, updated, reasonable, and more usable and enforceable–and therefore, more adoptable. A clean version of the final result of RB7-22 incorporating this public comment, without strike-throughs and underlines, can be viewed via this link:
https://www.cdpaccess.com/p/public-comment/3211/27823/files/download/3692/RB7-WABO-clean%20final%20V2%201.pdf

In developing this public comment, we have collaborated with the FEMA/ATC Seismic Code Support Committee, and this public comment will work in conjunction with their code change proposals and public comments. Attached is a document showing how Appendix AJ is intended to look, if this public comment and all the SCSC proposals and public comments are approved

https://www.cdpaccess.com/p/public-comment/3211/27823/files/download/3693/WABO-FEMA%20Combined%20Proposals-V2%201.pdf

OVERVIEW

Relation of Appendix to Code:

The underlying philosophy for this public comment is that the appendix, when adopted, is to be added to the code. It is not a standalone existing buildings code. This is true of the existing appendix, despite its "deemed to comply" provision in the existing AJ101.1. Given that philosophy, the "deemed to comply" language has been deleted, since it could imply that none of the rest of the code applies–which is clearly erroneous, as we would expect items not in the appendix to be regulated by the rest of the IRC. In its place, the appendix now clearly says to comply with the IRC for new construction, except where Appendix AJ modifies those provisions. Carrying this philosophy through results in the deletion of many redundant provisions and definitions (further explanations below).

Reorganization:

This public comment deletes several unnecessary and outdated sections, as follows. Deletion of these sections results in the editorial renumbering of the subsequent sections, as shown in this public comment.

- Section AJ103 (Preliminary Meeting). This section required the building official to meet with a permit applicant, at the applicant's request. The stated purpose of the meeting is for the building official to understand the applicant's intention for the work, and for the building official and the applicant to collaborate on what's required. This requirement is unnecessary, as this is a service that a reasonable building department will provide on request. In addition, many the issues can be handled in other ways other than a meeting.
- AJ104 (Evaluation of an Existing Building). This provision that allows the building official to require an evaluation of the existing building by a registered design professional is tied to "reconstruction." Aside from the fact that provisions relating to "reconstruction" are being deleted (see below), Section R106.1 already gives the building official this authority.

- Sections AJ108 (Renovations) and AJ110 (Reconstruction). See "Terminology and Definitions" below.

New Sections AJ106 (Additions) and AJ107 (Relocations) have been added to regulate those classifications of work.

SPECIFIC CHANGES

Purpose and Intent (AJ101):

- The scope now refers to repairs, alterations, additions and relocations, consistent with the changes described in "Terminology and Definitions" below.
- The scope also clearly states that the rest of the code applies, where it's not modified by Appendix AJ.
- Sections AJ101.2 (classification of work) and AJ101.3 (multiple categories of work) have been deleted since they are unnecessary. The text in AJ101.2 doesn't do anything. Most of AJ101.3 is clear with the new classifications of work and their definitions. Regarding the 12-month period in AJ101.3, this is something that should be covered by building department procedures and policies for each jurisdiction, and reflect how flexible they want to be. Having a set period of time unnecessarily ties the building official's hands, and encourages gaming of the system

Compliance (AJ102):

- Carbon monoxide alarms are required to be installed, consistent with Section R315.2.2 (AJ102.3).
- The sections relating to replacement EERO windows has been reorganized and modified for clarity and flexibility (AJ102.4.3). The current provisions provide a break on full compliance for replacement windows for emergency escape and rescue openings. This public comment provides flexibility for the vertical height of the window opening control devices and fall protection devices in existing openings. It also clarifies that window opening control devices and fall protection are not required when window replacement is of the glazing only. These changes are consistent with the concept approved by the Committee in RB99-22.
- Sections AJ102.7 (Other Alternatives) and AJ102.9 (Features exceeding code requirements) are deleted because they are unnecessary. AJ102.7 is covered in Chapter 1, and there are never restrictions on exceeding code requirements (AJ102.9).
- This public comment also makes editorial changes to this section, deleting unnecessary verbiage ("regardless of the category of work being performed") and updating the terminology (smoke alarms vs detectors)

Terminology and Definitions (AJ103):

The end result of the changes to the definitions is that only the additional definitions that are needed to apply the provisions of the appendix remain in Section AJ103.

- This public comment deletes the unfamiliar terms "reconstruction," "rehabilitation," and "renovation" from the definitions, along with the sections regulating them. Instead, the appendix now exclusively uses "repair," "alteration," "addition," and "relocation" to refer to the work being done on an existing building. These terms are familiar to users of the I-codes, and more closely correspond with the terms used in Section 107.2.1 of the IRC.
- Unnecessary definitions for "equipment or fixture" and "materials and methods requirements," and "rehabilitation" have been deleted. "Equipment" and "fixtures" are well understood to users of the code. Alternate materials and methods are covered in Chapter 1. "Rehabilitation" was defined, but the term is not used in either the existing appendix or the appendix as modified by this public comment.
- The definition for "dangerous" is being added since it is not defined in Chapter 2. The language is taken from the IEBC.

Repairs (AJ104):

The modifications this public comment makes to the section on repairs are editorial. The change in Section AJ104.1 from "work" to "repair" clarifies the scope of the section is about repair work, not work in general. The modification Section AJ104.3 consolidates the exceptions which required compliance with IRC Chapters 34 through 43 anyway.

Alterations (AJ105):

- New Section AJ105.1 scopes the alterations section, as well as clearly states newly-installed elements need to comply with the code for new construction. The "do no harm" provision is included as well, consistent with Section R102.7.1.
- The existing section on extensive alterations is being deleted because it referred to the deleted section on reconstruction. For further discussion of the technical changes, see the discussion on Reconstruction below.
- AJ105.4 provides a pointer to the sections regulating structural alterations. Note that other code change proposals and public comments would add further structural provisions to the appendix.

- Section AJ105.4.1 on unreinforced masonry walls has been relocated from the deleted section on renovations.
- Substantive changes to Section AJ105.5 on electrical equipment and wiring add a requirement that lighting outlets must be controlled by a wall-mounted switch, located near an entrance to the room, consistent with IRC Section E3903.2 (AJ105.5.3.4). The other changes are editorial, including the clarification that the circuit is a "branch" circuit, consistent with the definitions in IRC Section E3501.1 (AJ105.5.3.2). The exception to AJ105.5.1 isn't really an exception and still refers to the same chapters, so it has been integrated into the main charging language.
- The existing appendix permits a ceiling height of not less than 6 feet 8 inches. This public comment further extends the relief on ceiling height in existing buildings to include existing attics (AJ105.7). Bathrooms, toilet rooms and laundry rooms are allowed to have a ceiling height not less than 6 feet 4 inches, similar to a break these occupiable spaces receive in new construction (R305.1, Exception 3). The first exception maintains the sloped ceiling height provisions per R305.1 for new construction but lowers the minimum ceiling height requirement for 50% of the room from 7 feet to 6 feet 8 inches, consistent with the general requirement. The second exception maintains the allowance for beams, girders, and other obstructions that is permitted in new construction. This concept was supported by the Committee in their approval of RB82-22.
- Section AJ105.8 is expanded to include requirements for stairway illumination (AJ105.8.5) and handrails and guards at stairs (AJ105.8.6). The provision for stairway illumination is relocated from the deleted section on reconstruction. In a substantive change to the current appendix provisions, if the stair is altered, compliant handrails and guards must be installed (AJ105.8.6). This remedies an unsafe condition. The new section on stair treads and risers (AJ105.8.4) gives a break for stair treads and risers that is consistent with a more general break for existing stairs in IEBC Section 506.3. The concept of the break was supported by the Committee in their approval of RB114-22.

Additions (AJ106):

This is a new section in this appendix. The requirement for additions to comply with new construction is consistent with the principles in Section R102.7.1 and the IEBC.

Relocations (AJ107):

This is a new section in this appendix. The provisions are consistent with how the IEBC treats moved buildings (see IEBC Section 1401.2).

Referenced Standards (AJ108):

- ASTM F2090 is stricken from Table AJ108.1. Section AJ102.4.3 is revised to refer to Section R312.2 which contains the reference to this standard within the body of the code.
- Reference to the International Existing Building Code is updated to the 2024 edition.
- Reference to the International Fire Code and to the International Property and Maintenance Code is added as reference to these codes is added in Section AJ107 Relocated Buildings.

PROVISIONS IN DELETED SECTIONS ON RENOVATIONS AND RECONSTRUCTION

Renovations:

All of the sections in the section on renovations have been deleted without relocating them. The sections on materials and methods and on interior finish are unnecessary because this appendix is only about modifications to the code. The section on door and window dimensions is deleted because "minor reductions" is ambiguous, and unnecessary.

Reconstruction:

Sections on stairway illumination, handrails, and guards have either been moved to new Section AJ105.8, or are already covered by that section. The ceiling height allowance is now located in the Alterations section (AJ105.7).

The sections on wall and ceiling finish and separation walls have been deleted without substitution because they were incomplete, and it is unreasonable to trigger these retroactive requirements for the following reasons:

- The current provisions are incomplete because they only deal with common wall separations as you would find in townhouse-style units (vertical), and not with duplexes with horizontal separations.
- As far as it being unreasonable, the section on wall and ceiling finishes would require additional costs to comply, both to provide the materials, and to comply with permit requirements. It requires an accounting of every wall and ceiling finish in the work area in terms of the actual materials, and then whether they comply with the flame spread and smoke development requirements. In older construction, this could be difficult to determine, and from a plan review standpoint, would likely result in at least two rounds of

corrections—the first to request the information, the second to tell them to fix it.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Since the public comment moves these provisions into an optional appendix, there will be no effect on the cost of construction.

Final Hearing Results

RB7-22	AMPC1,2

RB8-22

Original Proposal

IRC: R102.7.1, R110.2

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, 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 Residential Code

Revise as follows:

R102.7.1 Additions, alterations, change of use, or repairs. *Additions*, *alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations,* repairs and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the *addition*, *alteration* or *repair*. ~~An existing building together with its *additions* shall comply with the height limits of this code. Where the *alteration* causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.~~ Where additions, alterations, or changes of use to an existing structure result in a use or occupancy, height, or means of egress outside the scope of this code, the building shall comply with the International Existing Building Code.

Delete without substitution:

~~**R110.2 Change in use.** Changes in the character or use of an existing structure shall not be made except as specified in Sections 506 and 507 of the International Existing Building Code.~~

Reason: The current code language for existing buildings only addresses two of the three items defining what buildings are within the scope of the IRC--height and use. It does not deal with independent means of egress. This proposal more comprehensively addresses all the changes that can take a building out of the scope of the IRC, and directly points the user to the IEBC for those buildings. This proposal also removes a conflict in the code.
In order to be within the scope of the IRC, buildings must comply with three conditions (R101.2):

- Use. The buildings must be one- or two-family dwellings, or townhouses. In addition to residential use, five special uses are allowed in these buildings.
- Height. Buildings must be three stories or less.
- Egress. The units must have separate (independent) means of egress. They are not allowed to share a stairway or an egress balcony.

The current provisions in the code address additions that make the height of the building non-compliant with the IRC (R102.7.1, third sentence), and alterations to the use or occupancy that make the use non-compliant with the code (R102.7.1, last sentence). However, the current text does not address changes of use that are proposed without any construction, and while they are rare, there are circumstances where alterations or additions to the building could combine means of egress for two or more of the units.

Regarding the means of egress, in Seattle, we saw at least one project that because of topography and lot configuration, was originally designed with an elevated egress balcony, shared by all the townhouse-style units, leading to the right of way. In order to keep the project within the scope of the IRC, the site was redesigned so that independent means of egress was provided from each unit, but the shared, elevated (no-longer-egress) balcony remained. Alterations to the site could make this balcony the only means of egress again, which would then take the building out of the scope of the IRC. This proposal clarifies that if such a change is made, the IEBC would govern code compliance.

We have proposed to add "change of use" to the section title and the text in order to cover the cases where there may be a desire to change the use of a space without doing any construction. "Alterations" will not cover that case, since the definition refers to "construction, retrofit, or renovation." "Retrofit" is only defined in two appendices in the IEBC, and in ANSI/APSP/ICC-7 (suction entrapment standard), but those definitions imply some sort of construction is occurring. Similarly, "renovation" is only defined in IRC Appendix J and the IZC, where the definitions also imply some sort of construction.

This proposal also changes the viewpoint of the provision. Rather than saying, "In order to stay in the IRC, here's what you do," it takes the approach of, "If you go outside of scope of the IRC, go instead to the IEBC." This is more direct than saying "the provisions of the IEBC shall apply."

We are proposing to delete Section R110.2 for three reasons:

1. Section R110.2 conflicts with the existing language in the last sentence in Section R102.7.1. R110.2 currently points the user to two provisions within the Prescriptive Method--Change of Use (IEBC 506) and Historic Buildings (IEBC 507). The current reference to the IEBC in R102.7.1 is more flexible, allowing use of all three methods (Prescriptive, Work Area, or Performance) at the owner's or designer's discretion. The generic reference to the IEBC in the revised R102.7.1 will also cover any historic building provisions.
2. Aside from being buried in an obscure location, this provision does not belong in a section for Certificates of Occupancy. It more appropriately belongs in the section dealing with existing buildings.
3. Section R110.2 only deals with changes of use/occupancy. As noted above, there are other provisions in the scope of the IRC that are addressed by this proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of the existing provisions, sending users to the governing code. This will not result in a change in the cost of construction under the IRC, since it only addresses alterations and additions that take the building out of the scope of the IRC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this change so that the IRC will better address a change in use to an existing dwelling that is not covered by the scope of the IRC. (Vote: 9-1)

Final Hearing Results

RB8-22 AS

RB10-22

Original Proposal

IRC: SECTION R103, R103.1, R103.2, R103.3

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

2021 International Residential Code

Revise as follows:

SECTION R103
~~DEPARTMENT OF BUILDING SAFETY~~<u>CODE COMPLIANCE AGENCY</u>

R103.1 Creation of ~~enforcement~~ agency. The ~~department of building safety~~ <u>[INSERT NAME OF DEPARTMENT]</u> is hereby created and the official in charge thereof shall be known as the *building official*. <u>The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.</u>

R103.2 Appointment. The *building official* shall be appointed by the <u>chief appointing authority of the</u> *jurisdiction*.

R103.3 Deputies. In accordance with the prescribed procedures of this *jurisdiction* and with the concurrence of the appointing authority, the *building official* shall have the authority to appoint a deputy *building official*, ~~the~~ <u>other</u> related technical officers, inspectors, ~~plan examiners~~ and other employees. Such employees shall have powers as delegated by the *building official*.

Reason: The purpose of this proposal is consistency through the family of codes for Enforcement Agency. During the 2018-2019 code development cycle, ADM 16-19 Parts 1 and III was approved for inclusion of this language in the IBC, IFC, IEBC, IPC, IMC, IFGC, IPMC, ISPSC, IPSDC, IGCC and IWUIC. BCAC is proposing this change again to the IRC to complete uniformity and consistency of language among all codes.
A survey of several departments across the country showed that jurisdictions choose many different names. ADM 16-19 proposed to change the name of this section to "Code Compliance Agency" and add a fill in the blank for the adopting agency to choose a name specific to their jurisdiction. In addition to these changes, all three sub-sections were modified to use language that is common in a majority of the codes. Specifically, a sentence was added to the section "Creation of the Agency" to state the function of the agency. In the section titled "Appointment," the term "chief appointing authority of the" was inserted before "jurisdiction." This was intended to be more specific and in line with the language in the section titled "Deputies," which uses the phrase "appointing authority." This language was not intended to name a specific individual or group of individuals. It was intended to identify anyone within the jurisdiction who has the authority to make appointments or staffing decisions. This could be anyone from an elected official or a person or group of people who have been designated to make staffing decisions. The 2019 IRC committee also felt there was potential conflict with state and local laws. We believe it is incumbent on the jurisdiction adopting codes to make any modifications necessary to resolve conflicts that are specific for their locality.

The BCAC is working from the philosophy that ICC is a family of codes, so administrative requirements should be consistent across codes. 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 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). 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 is an editorial change that provides consistency between I-codes. This may be a reduction in the administrative costs for the building department by increasing options.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal will allow for the jurisdiction to name their code compliance agency. This will be consistent with the other I-codes. (Vote: 10-0)

Final Hearing Results

RB10-22	AS

RB14-22

Original Proposal

IRC: R105.2, SECTION 202, TABLE R301.2.1.5.1, R302.1, TABLE R302.1(2), R301.2.2.6, R302.5, R302.5.1, R302.5.2, R302.6, TABLE R302.6, R302.3, R310.6, R311.1, R311.2, R314.3, R320.2, R324.6.2.1, R324.6.3, R801.3, R1006.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R105.2 Work exempt from permit. Exemption 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. Other than *storm shelters*, one-*story* detached *accessory structures,* provided that the floor area does not exceed 200 square feet (18.58 m^2).
2. Fences not over 7 feet (2134 mm) high.
3. 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.
4. Water tanks supported directly upon *grade* if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings 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.
10. Decks not exceeding 200 square feet (18.58 m^2) in area, that are not more than 30 inches (762 mm) above *grade* at any point, are not attached to a *dwelling* or *townhouse* and do not serve the exit door required by Section R311.4.

Electrical:

1. *Listed* cord-and-plug connected temporary decorative lighting.
2. Reinstallation of attachment plug receptacles but not the outlets therefor.
3. Replacement of branch circuit overcurrent devices of the required capacity in the same location.
4. Electrical wiring, devices, *appliances,* apparatus or *equipment* operating at less than 25 volts and not capable of supplying more than 50 watts of energy.
5. Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.

Gas:

1. Portable heating, cooking or clothes drying *appliances*.
2. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
3. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Mechanical:

1. Portable heating *appliances*.
2. Portable ventilation *appliances*.
3. Portable cooling units.
4. Steam, hot- or chilled-water piping within any heating or cooling *equipment* regulated by this code.
5. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.
6. Portable evaporative coolers.
7. Self-contained refrigeration systems containing 10 pounds (4.54 kg) or less of refrigerant or that are actuated by motors of 1 horsepower (746 W) or less.
8. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, 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 such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

[RB] ACCESSORY STRUCTURE. A structure that is accessory to and incidental to that of the *dwelling(s)* or *townhouse(s)* and that is located on the same *lot*.

TABLE R301.2.1.5.1 ULTIMATE DESIGN WIND SPEED MODIFICATION FOR TOPOGRAPHIC WIND EFFECT[a, b]

ULTIMATE DESIGN WIND SPEED FROM FIGURE R301.2(2) (mph)	AVERAGE SLOPE OF THE TOP HALF OF HILL, RIDGE OR ESCARPMENT (percent)						
	0.10	0.125	0.15	0.175	0.20	0.23	0.25
	Required ultimate design wind speed-up, modified for topographic wind speed-up (mph)						
95	114	119	123	127	131	137	140
100	120	125	129	134	138	144	147
105	126	131	135	141	145	151	154
110	132	137	142	147	152	158	162
115	138	143	148	154	159	165	169
120	144	149	155	160	166	172	176
130	156	162	168	174	179	NA	NA
140	168	174	181	NA	NA	NA	NA
150	180	NA	NA	NA	NA	NA	NA

For SI: 1 mile per hour = 0.447 m/s, 1 foot = 304.8 mm.

NA = Not Applicable.

a. Table applies to a feature height of 500 feet or less and dwellings and *townhouses* sited a distance equal or greater than half the feature height.

b. Where the ultimate design wind speed as modified by Table R301.2.1.5.1 equals or exceeds 140 miles per hour, the building shall be considered as "wind design required" in accordance with Section R301.2.1.1.

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings*, *townhouses*, and accessory buildings shall comply with Table R302.1(1); or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.

4. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS AND TOWNHOUSES WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour–tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings and/or *townhouses* are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.

R301.2.2.6 Irregular buildings. The seismic provisions of this code shall not be used for structures, or portions thereof, located in *Seismic Design Categories* C, D_0, D_1 and D_2 and considered to be irregular in accordance with this section. A building or portion of a building shall be considered to be irregular where one or more of the conditions defined in Items 1 through 8 occur. Irregular structures, or irregular portions of structures, shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. Where the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, the remainder of the building shall be permitted to be designed using the provisions of this code.

1. ***Shear wall* or braced wall offsets out of plane.** Conditions where exterior *shear wall* lines or *braced wall panels* are not in one plane vertically from the foundation to the uppermost story in which they are required.

   Exception: For wood *light-frame construction*, floors with cantilevers or setbacks not exceeding four times the nominal depth of the wood floor joists are permitted to support *braced wall panels* that are out of plane with *braced wall panels* below provided that all of the following are satisfied:

   1. Floor joists are nominal 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) on center.
   2. The ratio of the back span to the cantilever is not less than 2 to 1.
   3. Floor joists at ends of *braced wall panels* are doubled.
   4. For wood-frame construction, a continuous rim joist is connected to ends of cantilever joists. Where spliced, the rim joists shall be spliced using a galvanized metal tie not less than 0.058 inch (1.5 mm) (16 gage) and $1^1/_2$ inches (38 mm) wide fastened with six 16d nails on each side of the splice; or a block of the same size as the rim joist and of sufficient length to fit securely between the joist space at which the splice occurs, fastened with eight 16d nails on each side of the splice.
   5. Gravity loads carried at the end of cantilevered joists are limited to uniform wall and roof loads and the reactions from headers having a span of 8 feet (2438 mm) or less.

2. **Lateral support of roofs and floors.** Conditions where a section of floor or roof is not laterally supported by *shear walls* or *braced wall lines* on all edges.

   Exception: Portions of floors that do not support *shear walls*, *braced wall panels* above, or roofs shall be permitted to extend not more than 6 feet (1829 mm) beyond a *shear wall* or *braced wall line*.

3. ***Shear wall* or braced wall offsets in plane.** Conditions where the end of a *braced wall panel* occurs over an opening in the wall below and extends more than 1 foot (305 mm) horizontally past the edge of the opening. This provision is applicable to *shear walls* and *braced wall panels* offset in plane and to *braced wall panels* offset out of plane in accordance with the exception to Item 1.

   Exception: For wood light-frame wall construction, one end of a *braced wall panel* shall be permitted to extend more than 1 foot (305 mm) over an opening not more than 8 feet (2438 mm) in width in the wall below provided that the opening includes a header in accordance with all of the following:

   1. The building width, loading condition and framing member species limitations of Table R602.7(1) shall apply.
   2. The header is composed of:
      - 2.1. Not less than one 2 × 12 or two 2 × 10 for an opening not more than 4 feet (1219 mm) wide.
      - 2.2. Not less than two 2 × 12 or three 2 × 10 for an opening not more than 6 feet (1829 mm) in width.
      - 2.3. Not less than three 2 × 12 or four 2 × 10 for an opening not more than 8 feet (2438 mm) in width.
   3. The entire length of the *braced wall panel* does not occur over an opening in the wall below.

4. **Floor and roof opening.** Conditions where an opening in a floor or roof exceeds the lesser of 12 feet (3658 mm) or 50 percent of the least floor or roof dimension.

5. **Floor level offset.** Conditions where portions of a floor level are vertically offset.

   Exceptions:

   1. Framing supported directly by continuous foundations at the perimeter of the building.
   2. For wood *light-frame construction*, floors shall be permitted to be vertically offset where the floor framing is lapped or tied together as required by Section R502.6.1.

6. **Perpendicular *shear wall* and wall bracing.** Conditions where *shear walls* and *braced wall lines* do not occur in two perpendicular directions.
7. **Wall bracing in stories containing masonry or concrete construction.** Conditions where stories above *grade plane* are partially or completely braced by wood wall framing in accordance with Section R602 or cold-formed steel wall framing in accordance with Section R603 include masonry or concrete construction. Where this irregularity applies, the entire story shall be designed in accordance with accepted engineering practice.

   Exceptions: Fireplaces, chimneys and masonry veneer in accordance with this code.

8. **Hillside *light-frame construction*.** Conditions in which all of the following apply:

   8.1. The grade slope exceeds 1 unit vertical in 5 units horizontal where averaged across the full length of any side of the *building* ~~dwelling~~.

   8.2. The tallest cripple wall clear height exceeds 7 feet (2134 mm), or where a post and beam system occurs at the *building* ~~dwelling~~ perimeter, the post and beam system tallest post clear height exceeds 7 feet (2134 mm).

   8.3. Of the total plan area below the lowest framed floor, whether open or enclosed, less than 50 percent is living space having interior wall finishes conforming to Section R702.
   Where Item 8 is applicable, design in accordance with accepted engineering practice shall be provided for the floor immediately above the cripple walls or post and beam system and all structural elements and connections from this diaphragm down to and including connections to the foundation and design of the foundation to transfer lateral loads from the framing above.

   Exception: Light-frame construction 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* ~~dwelling~~ need not be considered an irregular *building* ~~dwelling~~ under Item 8.

R302.5 Dwelling unit-garage opening and penetration protection. Openings and penetrations through the walls or ceilings separating the *dwelling unit* from the garage shall be in accordance with Sections R302.5.1 through R302.5.3.

R302.5.1 Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and *dwelling unit* ~~residence~~ shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than $1^3/_8$ inches (35 mm) thick, or 20-minute fire-rated doors. Doors shall be self-latching and equipped with a self-closing or automatic-closing device.

R302.5.2 Duct penetration. Ducts in the garage and ducts penetrating the walls or ceilings separating the *dwelling unit* from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material and shall not have openings into the garage.

R302.6 Dwelling unit-garage fire separation. The garage shall be separated as required by Table R302.6. Openings in garage walls shall comply with Section R302.5. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.6 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

TABLE R302.6 DWELLING UNIT-GARAGE SEPARATION

SEPARATION	MATERIAL

SEPARATION	MATERIAL
From the *dwelling unit* residence and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the garage side
From habitable rooms above the garage	Not less than $^5/_8$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^1/_2$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of $^1/_2$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^5/_8$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the ~~*dwellings*~~ *dwelling units* and the structural framing supporting the ceiling is protected by not less than $^1/_2$-inch (12.7 mm) gypsum board or equivalent.

R310.6 Dwelling additions. Where *dwelling unit additions* contain sleeping rooms, an *emergency escape and rescue opening* shall be provided in each new sleeping room. Where *dwelling unit additions* have *basements*, an *emergency escape and rescue opening* shall be provided in the new *basement*.

Exceptions:

1. An *emergency escape and rescue opening* is not required in a new *basement* that contains a sleeping room with an *emergency escape and rescue opening*.
2. An *emergency escape and rescue opening* is not required in a new *basement* where there is an *emergency escape and rescue opening* in an existing *basement* that is *accessed* from the new *basement*.
3. An operable window complying with Section 310.7.1 shall be acceptable as an *emergency escape and rescue opening*.

R311.1 Means of egress. ~~*Dwellings*~~ *Dwelling units* shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the *dwelling unit* to the required egress door without requiring travel through a garage. The required egress door shall open directly into a *public way* or to a *yard* or court that opens to a *public way*.

R311.2 Egress door. Not less than one egress door shall be provided for each *dwelling unit*. The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling unit* without the use of a key or special knowledge or effort.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the *dwelling unit*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In ~~*dwellings* or~~ *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.
5. In the hallway and in the room open to the hallway in *dwelling units* where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.

R320.2 Live/work units. In *live/work units,* the nonresidential portion shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a *building* ~~structure~~ where there are four or more *live/work units,* the residential ~~dwelling~~ portion of the *live/work unit* shall comply with Section 1108.6.2.1 of the *International Building Code*.

R324.6.2.1 Alternative setback at ridge. Where an automatic sprinkler system is installed within the dwelling or *townhouse* in accordance with NFPA 13D or Section P2904, setbacks at ridges shall comply with one of the following:

1. For photovoltaic arrays occupying not more than 66 percent of the plan view total roof area, not less than an 18-inch (457 mm) clear setback is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, not less than a 36-inch (914 mm) clear setback is required on both sides of a horizontal ridge.

R324.6.3 Emergency escape and rescue openings. Panels and modules installed on dwellings and *townhouses* shall not be placed on the portion of a roof that is below an *emergency escape and rescue opening*. A pathway not less than 36 inches (914 mm) wide shall be provided to the *emergency escape and rescue opening*.

Exception: BIPV systems *listed* in accordance with Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

R801.3 Roof drainage. In areas where *expansive soils* or *collapsible soils* are known to exist, all *dwellings* and *townhouses* shall have a controlled method of water disposal from roofs that will collect and discharge roof drainage to the ground surface not less than 5 feet (1524 mm) from foundation walls or to an *approved* drainage system.

R1006.2 Exterior air intake. The exterior air intake shall be capable of supplying all *combustion air* from the exterior of the *dwelling unit* or from spaces within the *dwelling unit* ventilated with outdoor air such as nonmechanically ventilated crawl or attic spaces. The exterior air intake shall not be located within the garage or *basement* of the dwelling unit. The exterior air intake, for other than *listed* factory-built fireplaces, shall not be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of $^{1}/_{4}$-inch (6.4 mm) mesh.

Reason: This proposal does not intend to change any currently interpreted applications of any of these provisions. The goal is to use proper and defined terminology appropriately. Currently the IRC distinguishes two different "buildings". A "dwelling" and a "townhouse". Within a dwelling are "dwelling units". Within a townhouse are "townhouse units", which are also, by definition, dwelling units. The code uses the term "residence" in a few places, which leads a mind to wonder... "is that significant? Am I supposed to interpret 'residence' to be something unique?"
This proposal was careful to include "townhouse" alongside existing uses of the term "dwelling" where the provision is in reference to the building as a whole. Other times, the existing term "dwelling" was changed to "dwelling unit" when a provision in reference to something specific to each "unit" within a dwelling or townhouse.

NOTE: dwellings and townhouse remain distinctly separate in the braced wall seismic provisions where design category C is regulated differently between the two buildings. This was not oversight.

The term "building" is defined, and thus chosen over "structure" when directly discussing dwellings or townhouses. Provisions related to other structures, such as decks, remain as "structures" in sections not included in this proposal.

If this proposal overlooked sections where this clarification is necessary, identification of those sections is welcomed by the proponent so they can be included in a public comment to further fine tune this goal.

The code must use the proper terms, especially when they are defined. "PRESENT THE INTENT" -spread the word...

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The clarifications in this proposal are most commonly already interpreted in this manner. The proposals simply changes the words to match the intent that is already in application.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The proposal is a clarification of the requirements by using the correct terms for dwellings and townhouses. (Vote: 10-0)

Final Hearing Results

RB14-22	AS

RB15-22

Original Proposal

IRC: R105.3.1.1, R322.3.1, AJ102.5

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 Residential Code

Revise as follows:

R104.2.1~~R105.3.1.1~~ Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, *addition, alteration*, *repair* or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2, the *building official* shall examine or cause to be examined the *construction documents* and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the *building official* finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or *repair* of substantial damage and the building official shall require existing portions of the entire building or structure to meet the requirements of Section R322.
For the purpose of this determination, a substantial improvement shall mean any *repair*, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or *repair* is started. Where the building or structure has sustained substantial damage, repairs necessary to restore the building or structure to its predamaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following:

1. Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions.
2. Any *alteration* of a *historic building* or structure, provided that the *alteration* will not preclude the continued designation as a *historic building* or structure. For the purposes of this exclusion, a *historic building* shall be any of the following:
    2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
    2.2. Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.
    2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

R322.3.1 Location and site preparation. 1. New buildings and buildings that are determined to be substantially improved pursuant to Section R104.2.1 ~~R105.3.1.1~~ shall be located landward of the reach of mean high tide.
~~2.~~ For any alteration of sand dunes and mangrove stands, the building official shall require submission of an engineering analysis that demonstrates that the proposed alteration will not increase the potential for flood damage.

AJ102.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2 shall be subject to the provisions of Section R104.2.1~~R105.3.1.1~~.

Reason: The provision directs the building official to determine whether work proposed for existing dwellings constitutes substantial improvement and whether repairs of damage building constitute substantial damage. The proposal simply moves the provision out of Section R105 Permits to Section R104 Duties and Powers of the Building Official. The determination requirement is in the Duties and Powers sections of the IBC and IEBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal relocates a provision regarding substantial improvement determinations from one section to another section to

better align with the organization of the same provision in the IBC and IEBC. There is no change to the technical content of the provisions. By only relocating the existing requirement, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Moving the flood provisions from the permit section to the duties and powers of the code official section is a better location for these requirements. (Vote: 10-0)

Final Hearing Results

RB15-22	AS

RB16-22

Original Proposal

IRC: SECTION 202 (New), R105.3.1.1

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)

2021 International Residential Code

Add new definition as follows:

SUBSTANTIAL DAMAGE. Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT. Any *repair*, reconstruction, rehabilitation, *alteration*, *addition* or other improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained *substantial damage*, any repairs are considered substantial improvement regardless of the actual *repair* work performed.
The term does not, however, include either:

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the *building official* and that are the minimum necessary to assure safe living conditions.
2. Any *alteration* of a historic structure provided that the *alteration* will not preclude the structure's continued designation as a historic structure. For the purposes of this exclusion, a historic building shall be any of the following:
   2.1 Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.

   2.2 Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.

   2.3 Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

Revise as follows:

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. For applications for reconstruction, rehabilitation, *addition, alteration*, *repair* or other improvement of existing buildings or structures located in a flood hazard area as established by Table R301.2, the *building official* shall examine or cause to be examined the *construction documents* and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamaged condition. If the *building official* finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or *repair* of substantial damage and the building official shall require existing portions of the entire building or structure to meet the requirements of Section R322.
~~For the purpose of this determination, a substantial improvement shall mean any *repair*, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or *repair* is started. Where the building or structure has sustained substantial damage, repairs necessary to restore the building or structure to its predamaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following:~~

1. ~~Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions.~~

~~2. Any *alteration* of a *historic building* or structure, provided that the *alteration* will not preclude the continued designation as a *historic building* or structure. For the purposes of this exclusion, a *historic building* shall be any of the following:~~
  ~~2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.~~

  ~~2.2. Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.~~

  ~~2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.~~

Reason: This proposal does not change the requirement to determine whether work proposed on existing dwellings in flood hazard areas constitutes substantial improvement or repair of substantial damage. As currently written, the terms are defined in this Chapter 1 section, rather than in Section R202 Definitions. The proposal is to add definitions to Section R202 and remove the definition text from R104.3.1.1. This brings the IRC into alignment with the IBC and IEBC. Defining the terms is beneficial for those jurisdictions that do not adopt Chapter 1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal relocates the definitions from the second paragraph of Section R105.3.1.1 to Chapter 2 Definitions. There is no change to the technical content of the provisions. By only relocating existing definitions, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Adding the definitions for substantial damage and substantial improvements will assist in correct interpretation of the flood requirements. This is consistent with the IBC and IEBC. (Vote: 10-0)

Final Hearing Results

RB16-22 AS

RB20-22

Original Proposal

IRC: SECTION 202, R902.3

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 Residential Code

Revise as follows:

[RB] BUILDING-INTEGRATED PHOTOVOLTAIC <u>(BIPV)</u> ~~PRODUCT~~ <u>SYSTEM</u>. A building ~~product~~ <u>system</u> that incorporates *photovoltaic modules* and functions as ~~a~~ <u>an integral part</u> ~~component~~ of the building envelope, <u>such as *roof assemblies* and *roof coverings*, *exterior wall envelopes* and *exterior wall coverings*, and *fenestration*</u>.

R902.3 Building-integrated photovoltaic <u>(BIPV)</u> ~~product~~ <u>systems</u>. *Building-integrated photovoltaic* (BIPV) ~~*products*~~ <u>*systems*</u> installed as the roof covering shall be tested, *listed* and *labeled* for fire classification in accordance with UL 7103. Class A, B or C BIPV products shall be installed where the edge of the roof is less than 3 feet (914 mm) from a *lot line*.

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 four times in the I-codes, addressing roof access, rapid shutdown systems, and fire classification for roofing applications (IBC Sections 1205.2, 1205.2.3, 3111.3.2, 3113.3). IRC Section R324.5.2 directs BIPV systems to have a fire classification in accordance with Section R902.3.
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 “*exterior 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, and there is another proposal for this cycle to add these types of systems to Chapter 7 of the IRC.

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 in the codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved since the revised text is a more accurate and current definition for photovoltaic systems. This will provide consistency between the IRC and industry terminology. (Vote: 10-0)

Final Hearing Results

RB20-22	AS

RB22-22

Original Proposal

IRC: SECTION 202

Proponents: Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

[RB] EXTERIOR WALL.

An above-*grade* wall that defines the exterior boundaries of a building. Includes between-floor spandrels, peripheral edges of floors, roof and *basement* knee walls, dormer walls, gable end walls, gable end roof trusses, walls enclosing a mansard roof and *basement walls* with an average below-*grade* wall area that is less than 50 percent of the total opaque and nonopaque area of that enclosing side.

For the definition applicable in Chapter 11, see Section N1101.6.

Reason: This propsosal is to add gable end wall trusses to this definition which will clarify that these will be considered as part of the exterior walls. This is important since when determining fire ratings due to FSD the rating would need to incude these gable roof trusses. The proposal is also to delete the RE in front of Exterior Wall and replace that with RB - This would need to be done by ICC Staff since CDP Access does not allow this to be done.

Cost Impact: The code change proposal will increase the cost of construction

This change will only increase the cost of construciton in jurisdications that have not interpretated the code to include these gable end wall trusses to be fire rated when the FSD requires the rating

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The proposal was approved because this provides a more accurate definition for exterior walls and is consistent with the intent of the provisions in the code. (Vote: 8-2)

Final Hearing Results

RB22-22	AS

RB23-22

Original Proposal

IRC: SECTION 202

Proponents: Kristen Owen, Kris Owen, Consultant, Myself (kowen4568@gmail.com)

2021 International Residential Code

[RB] FIRE-RETARDANT-TREATED WOOD. Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface burning characteristics and resist propagation of fire.

Revise as follows:

~~**Other means during manufacture.** A process where the wood raw material is treated with a fire-retardant formulation while undergoing creation as a finished product.~~

~~**Pressure process.** A process for treating wood using an initial vacuum followed by the introduction of pressure above atmospheric~~.

Reason: The definition for fire-retardant-treated wood in the IRC needs to be consistent with the definition in the 2021 IBC. See G10-19(AMPC2).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
By matching the IBC definition to the IRC definition, there is no cost impact.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved the change would not prohibit any current treatment process; removes process descriptions that are not needed; and the revised proposal will provide coordination with the definition in the International Building Code (Vote: 10-0).

Final Hearing Results

RB23-22	AS

RB26-22

Original Proposal

IRC: SECTION 202

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

[RB] PAN FLASHING. Corrosion-resistant flashing at the base of an opening that is integrated into the building exterior wall to direct water to the *water-resistive barrier* surface or to the exterior and is premanufactured, fabricated, formed or applied at the job site.

Reason: It is very common to direct pan flashing drainage to the WRB surface for subsequent drainage to the exterior of a wall assembly. The current definition recognizes only drainage directly to the exterior and could be interpreted as preventing many common pan flashing drainage details that work and are being successfully used. This proposal also addresses a conflict with text in Section R703.4.1 which allows flashing (including pan flashing) to extend to the surface of the WRB.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects a definition to include common and cost-effective pan flashing drainage details.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because this reflect common installation instructions and is consistent with the requirements in Section R703.4.1. (Vote: 10-0)

Final Hearing Results

RB26-22	AS

RB27-22

Original Proposal

IRC: 202(New), R324.7

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 Residential 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.

Revise as follows:

R324.7 Ground-mounted photovoltaic (PV) panel systems. Ground-mounted photovoltaic (PV) panel systems shall be designed and installed in accordance with Section R301.

Reason: The newly proposed definition is identical to the definition created in the IBC by Proposal G193-21. The existing language in IRC Section R324.7 is edited to match the newly defined term.
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 aligns with the IBC, and provides clarity of terms.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this definition correlates the IRC with the IBC code change G193-21 and it does not add any additional requirements. (Vote: 10-0)

Final Hearing Results

RB27-22	AS

RB28-22

Original Proposal

IRC: SECTION 202 (New), TABLE R702.7(3)

Proponents: Theresa A Weston, The Holt Weston Consultancy, Rainscreen Association in North America (RAiNA) (holtweston88@gmail.com)

2021 International Residential Code

Add new definition as follows:

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.

Revise as follows:

TABLE R702.7(3) CLASS III VAPOR RETARDERS

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
Marine 4	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 2.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 3.75 over 2 × 6 wall.
5	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
6	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 11.25 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 10 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 15 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 12.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 20 over 2 × 6 wall.

a. Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, brick veneer with a clear airspace as specified in Table R703.8.4(1), rainscreen 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 Chapter 11.

Reason: This proposal defines the term *rainscreen system* and includes *rainscreen systems* in the list of vented claddings that permit the use of Class III vapor retarders in wall assemblies in climate zones in which interior vapor retarders are required.
The use of *rainscreen systems* in construction is common and growing. *Rainsreen systems* involve many different types of materials from concrete and brick to metal and plastic, yet the term is not universally defined. The concept of cladding and substrate 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 correlates with a proposal approved in Group A to the IBC Chapter 14.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an option to an existing descriptive list of options, thereby increasing choice but not adding any new requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it adds options for compliance; this correlates with approved definitions IBC; and the use of rain screen systems are growing by a significant amount, so it needs to be addressed in the IRC. (Vote: 9-0)

Final Hearing Results

RB28-22	AS

RB30-22

Original Proposal

IRC: SECTION 202

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, Washington State University, Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

[RB] SEISMIC DESIGN CATEGORY (SDC). A classification assigned to a structure based on its occupancy~~category~~ and the severity of the design earthquake ground motion at the site.

Reason: This proposal removes the archaic term “occupancy category,” which is no longer used by the I-Codes or ASCE 7, leaving the generic term “occupancy.” The new IBC/ASCE 7 term “Risk Category” has not been introduced because this would add an additional undefined term. A word search has indicated that this is the only location where the term "occupancy category" still remains in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and intended to maintain correct terminology.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because "occupancy category" is an term that is not longer used in the IRC and is not needed in this definition. The definition does not need to include 'risk category' like the IBC because the risk category for dwelling units are all Risk Category 2 in the IBC. The IRC is a stand alone code, so adding this to the IRC would add a level of complication that is not needed. (Vote: 9-1)

Final Hearing Results

RB30-22	AS

RB31-22

Original Proposal

IRC: 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 Residential Code

Revise as follows:

[RB] SOLAR ENERGY SYSTEM. A system that converts solar radiation to usable energy, including*photovoltaic panel systems,* <u>*BIPV systems*</u> and *solar thermal systems*.

Reason: BIPV systems are solar energy systems, but do not always utilize a rack support system. The definition of photovoltaic panel systems includes a rack support system.

[RB] PHOTOVOLTAIC PANEL SYSTEM. A system that incorporates discrete photovoltaic panels that convert solar radiation into electricity, including rack support systems.

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 used for various solar energy systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because there is a difference between BIVP system and the photovoltaic systems when it comes to rack supports, therefore this revision is needed. (Vote: 10-0)

Final Hearing Results

RB31-22	AS

RB32-22

Original Proposal

IRC: CHAPTER 3

Proponents: Timothy Pate, City and County of Broomfield, City and County of Broomfield (tpate@broomfield.org)

2021 International Residential Code

CHAPTER 3 BUILDING PLANNING

Revise as follows:

SECTION 301
DESIGN CRITERIA

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

SECTION R303 ~~R316~~
FOAM PLASTIC

SECTION R304 ~~R317~~
PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

SECTION R305 ~~R318~~
PROTECTION AGAINST SUBTERRANEAN TERMITES

SECTION R306 ~~R322~~
FLOOD-RESISTANT CONSTRUCTION

SECTION R307 ~~R323~~
STORM SHELTERS

SECTION R308 ~~R319~~
SITE ADDRESS

SECTION R309 ~~R313~~
AUTOMATIC FIRE SPRINKLER SYSTEMS

SECTION R310 ~~R314~~
SMOKE ALARMS

SECTION R311 ~~R315~~
CARBON MONOXIDE ALARMS

SECTION R312 ~~R304~~
MINIMUM ROOM AREAS

SECTION R313 ~~R305~~
CEILING HEIGHT

SECTION R314 ~~R325~~
MEZZANINES

SECTION R315 ~~R326~~
HABITABLE ATTICS

SECTION R316 ~~R309~~
GARAGES AND CARPORTS

SECTION R317 ~~R311~~
MEANS OF EGRESS

SECTION R318 ~~R310~~
EMERGENCY ESCAPE AND RESCUE OPENINGS

SECTION R319 ~~R312~~
GUARDS AND WINDOW FALL PROTECTION

SECTION R320
ACCESSIBILITY

SECTION R321
ELEVATORS AND PLATFORM LIFTS

Revise as follows:

SECTION R322 ~~R308~~
GLAZING

SECTION R323 ~~R303~~
LIGHT, VENTILATION AND HEATING

SECTION R324 ~~R306~~
SANITATION

SECTION R325 ~~R307~~
TOILET, BATH AND SHOWER SPACES

SECTION R326 ~~R327~~
SWIMMING POOLS, SPAS AND HOT TUBS

SECTION R327 ~~R324~~
SOLAR ENERGY SYSTEMS

SECTION R328
ENERGY STORAGE SYSTEMS

SECTION R329
STATIONARY ENGINE GENERATORS

SECTION R330
STATIONARY FUEL CELL POWER SYSTEMS

Reason: There are no technical changes to the text - this is a reorganization to improve usability of the code.Over the years there have been numbers 'adds' to IRC Chapter 3 without a general look at grouping or organization. The biggest stretch are the room area (R304) and height (R305) being multiple sections away from mezzanines (R325) and habitable attics (R326). The intent of this proposal is to reorganize the requirements into areas for the following:

- Structural (proposed R301-307)
- Fire (proposed R308 -311)
- Rooms and spaces (proposed R312-316)
- Means of egress (proposed R317-R319)
- Accessibility/Elevators (proposed R320-R321)
- MEP (proposed R322-R326)
- Energy (proposed R327-R330)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is only to reorganize the sections in Chapter 3 for ease of use. There are no technical changes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because this is a better organization and a more logical sequence for Chapter 3. This will require some retraining, but it will make the chapter easier to understand. (Vote: 6-4)

Final Hearing Results

RB32-22	AS

RB34-22

Original Proposal

IRC: TABLE R301.2, FIGURE R301.2(3), FIGURE R301.2(4), R301.2.3, ASCE/SEI Chapter 44

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Residential Code

Revise as follows:

TABLE R301.2 CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

<table>
<tr><th rowspan="2">GROUND SNOW LOAD, pg(asd)[o]</th><th colspan="4">WIND DESIGN</th><th rowspan="2">SEISMIC DESIGN CATEGORY[f]</th><th colspan="3">SUBJECT TO DAMAGE FROM</th><th rowspan="2">ICE BARRIER UNDERLAYMENT REQUIRED[h]</th><th rowspan="2">FLOOD HAZARDS[g]</th><th rowspan="2">AIR FREEZING INDEX[i]</th><th rowspan="2">MEANANNUALTEMP[j]</th></tr>
<tr><th>Speed[d] (mph)</th><th>Topographic effects[k]</th><th>Special wind region[l]</th><th>Windborne debris zone[m]</th><th>Weathering[a]</th><th>Frost line depth[b]</th><th>Termite[c]</th></tr>
<tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td colspan="13">MANUAL J DESIGN CRITERIA[n]</td></tr>
<tr><td colspan="3">Elevation</td><td>Altitude correction factor[e]</td><td>Coincident wet bulb</td><td>Indoor winter design dry-bulb temperature</td><td colspan="3">Indoor winter design dry-bulb temperature</td><td colspan="2">Outdoor winter design dry-bulb temperture</td><td colspan="2">Heating temperature difference</td></tr>
<tr><td colspan="3">—</td><td>—</td><td>—</td><td>—</td><td colspan="3">—</td><td colspan="2">—</td><td colspan="2">—</td></tr>
<tr><td colspan="3">Latitude</td><td>Daily range</td><td>Summer design gains</td><td>Indoor summer design relative humidity</td><td colspan="3">Indoor summer design dry-bulb temperature</td><td colspan="2">Outdoor summer design dry-bulb temperature</td><td colspan="2">Cooling temperature difference</td></tr>
<tr><td colspan="3">—</td><td>—</td><td>—</td><td>—</td><td colspan="3">—</td><td colspan="2">—</td><td colspan="2">—</td></tr>
</table>

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a. Where weathering requires a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, “negligible,” “moderate” or “severe” for concrete as determined from Figure R301.2(1). The grade of masonry units shall be determined from ASTM C34, ASTM C55, ASTM C62, ASTM C73, ASTM C90, ASTM C129, ASTM C145, ASTM C216 or ASTM C652.

b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(2). Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

e. The jurisdiction shall fill in this section of the table to establish the design criteria using Table 10A from ACCA Manual J or established criteria determined by the jurisdiction.

f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.

g. The jurisdiction shall fill in this part of the table with: the date of the jurisdiction’s entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas); and the title and date of the currently effective Flood Insurance Study or other flood hazard study and maps adopted by the authority having jurisdiction, as amended.

h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall fill in this part of the table with “NO.”

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F).”

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F).”

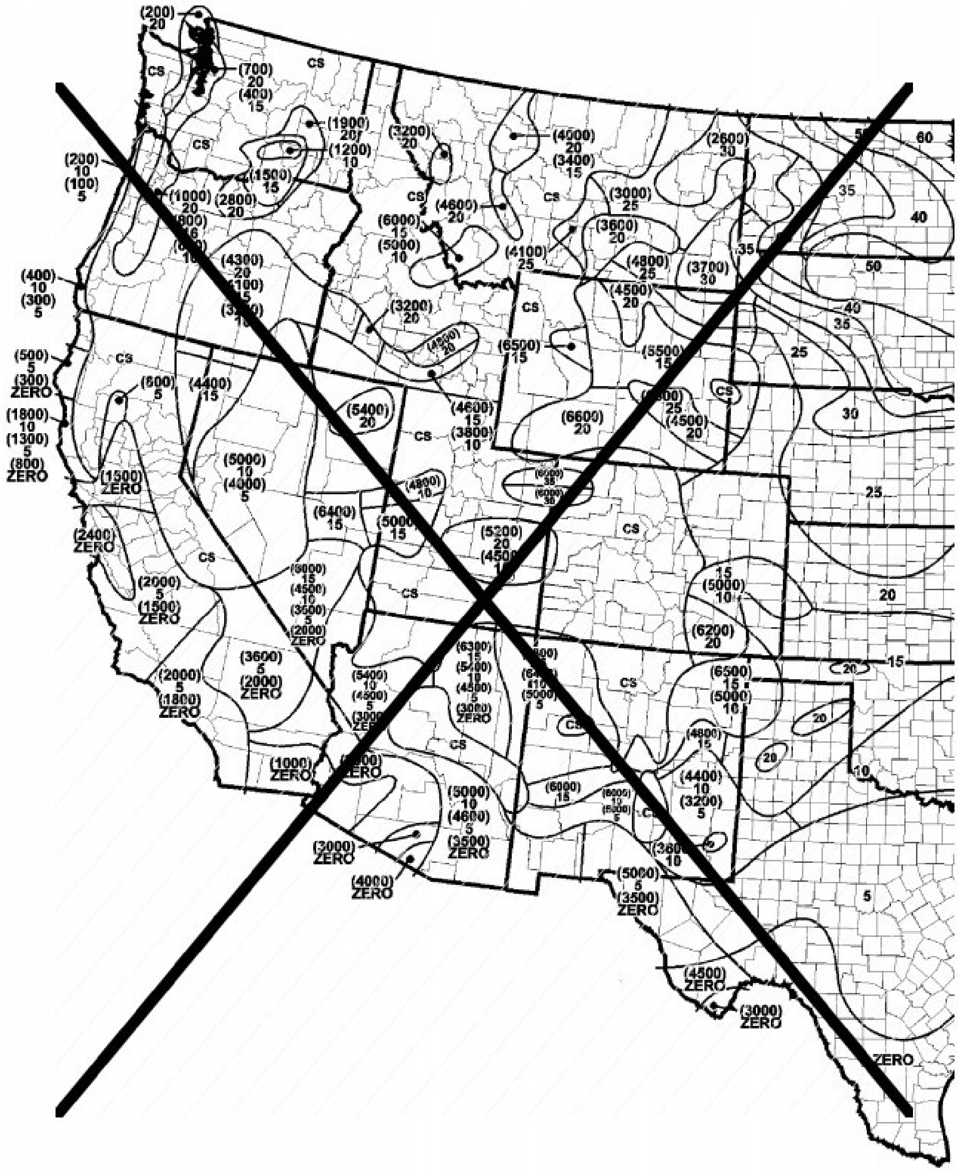
k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

l. In accordance with Figure R301.2(2), where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with “YES” and identify any specific requirements. Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

o. The jurisdiction shall fill in this section of the table using the *allowable stress design* Ground Snow Loads, $p_{g(asd)}$, in Figures R301.2(3) ~~and R301.2(4)~~.



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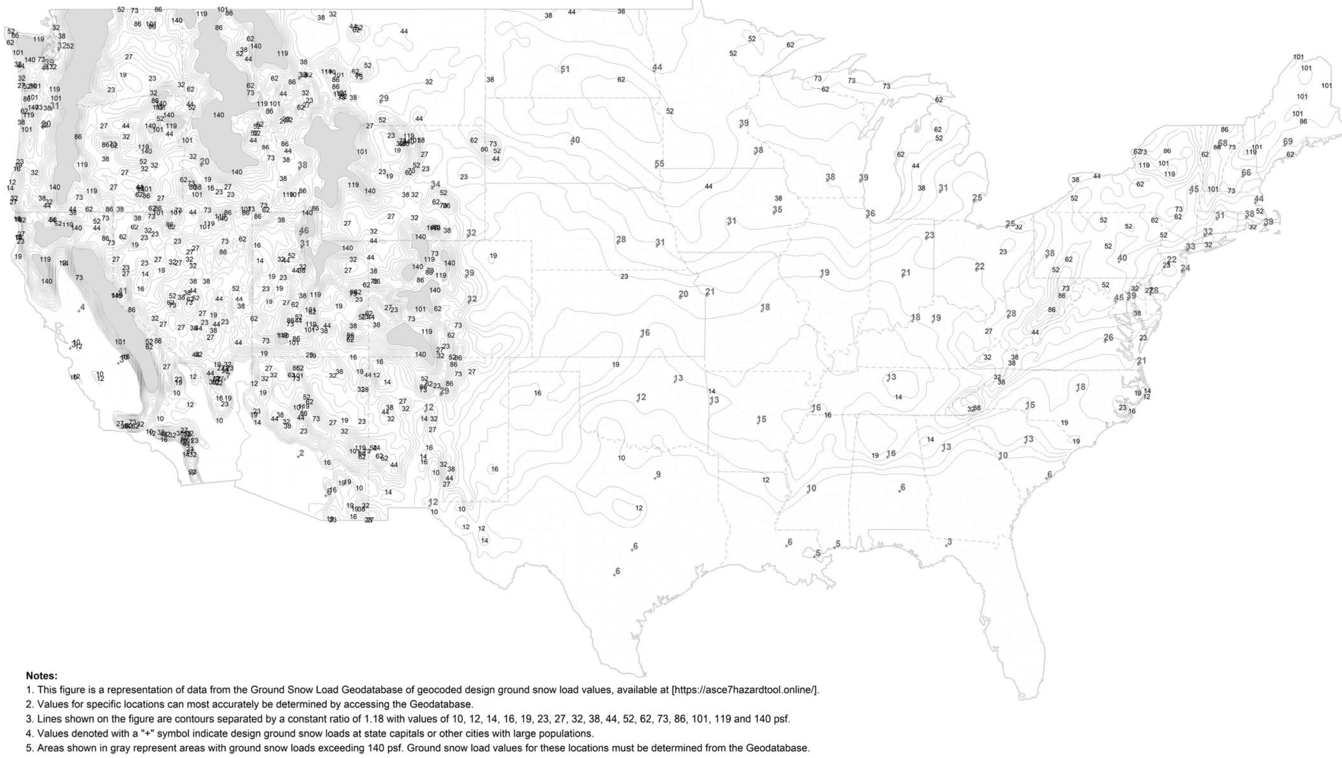


~~For SI: 1 foot = 34.8 mm, 1 pound per square foot =0.0479 kPa, 1 mile =1.61 km.~~

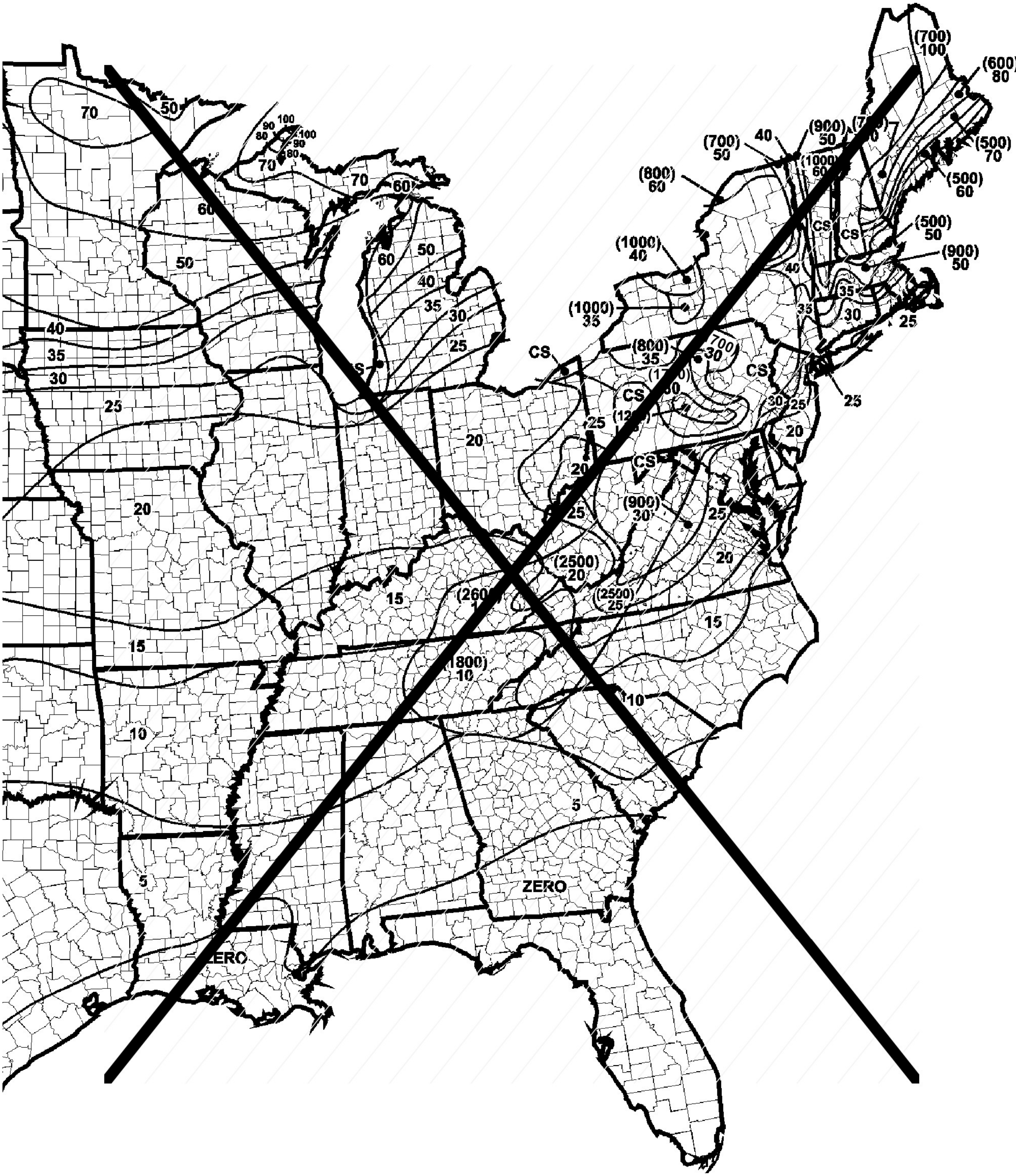
~~a. In CS areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.~~

~~b. Numbers in parentheses represent the upper elevation limits in feet for the ground snow load values presented below. Site-specific case studies are required to establish ground snow loads at elevations not covered.~~

1. 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.
2. 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.
3. Values denoted with a "+" symbol indicate design ground snow loads at state capitals or other high-population locations.
4. 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 R301.2(3) ALLOWABLE STRESS DESIGN GROUND SNOW LOADS, $p_{g(asd)}$, FOR THE UNITED STATES (lb/ft²)

Delete without substitution:



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~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mile = 1.61 km.~~

~~a. In CS areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.~~

~~b. Numbers in parentheses represent the upper elevation limits in feet for the ground snow load values presented below. Site-specific case studies are required to establish ground snow loads at elevations not covered.~~

~~**FIGURE R301.2(4) GROUND SNOW LOADS, P_g , FOR THE UNITED STATES (lb/ft²)**~~

Revise as follows:

R301.2.3 Snow loads. Ground snow loads shall be determined in accordance with Figure R301.2(3) Allowable Stress Design Ground Snow Loads, $p_{g(asd)}$, or shall be determined in accordance in with Section 1608 of the IBC.Wood-framed construction, cold-formed, steel-framed construction and masonry and concrete construction, and *structural insulated panel* construction in regions with *allowable stress design* ground snow loads, $p_{g(asd)}$, 70 pounds per square foot (3.35 kPa) or less, shall be in accordance with Chapters 5, 6 and 8. Buildings in regions with *allowable stress design* ground snow loads, $p_{g(asd)}$, greater than 70 pounds per square foot (3.35 kPa) shall be designed in accordance with accepted engineering practice.

ASCE/SEI

American Society of Civil Engineers
Structural Engineering Institute
Reston, VA 20191-4400

7~~–16 with Supplement 1~~ 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 coordination. 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.

Table R301.2 Climatic and Geographic Design Criteria. This table is updated to clarify that this is an allowable stress design ground snow load, $p_{g(asd)}$, in both the header and in footnote o. The definition for "Ground Snow Loads,$p_{g(asd)}$. Allowable stress design ground snow load" was submitted to Section 202 in the IBC.

Figure R301.2(3) Ground Snow Loads. This map was replaced with a new Allowable Stress Design Ground Snow Load,$p_{g(asd)}$, map

Section R301.2.3 Snow Loads. This section was updated with a pointer to the Allowable Stress Design Ground Snow Loads map, as well as a pointer to Section 1608 in the IBC. This was also clarified that all of the limits are for 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 this proposed new map provide a conversion from the strength-based values provided in the reliability-targeted ground snow loads maps in ASCE 7 and the IBC to an ASD map for the IRC.

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 where 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 in Figure 1 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%.

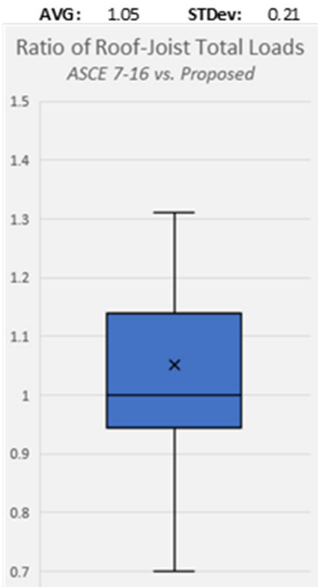


Figure 1. Box plot of ratio of roof-joist total loads of ASCE 7-16 vs. ASCE 7-22.

Included in the final report (Bean et al. 2021) comparisons were made between the ASCE 7-16 ground snow loads and the ASCE 7-22 ground snow loads maps after adjusting for ASD values; Figure 2 shows a map of the ratio between the ASCE 7-22 Risk Category II map and the ASCE 7-16 ASD map. Ratios are only calculated in areas where both 7-22 and 7-16 snow load requirements are between 10 and 100 psf. There is some resolution limitations to the mapped values that make comparisons difficult in the western states. From the map, areas of increase snow load and decrease snow load can be demonstrated.

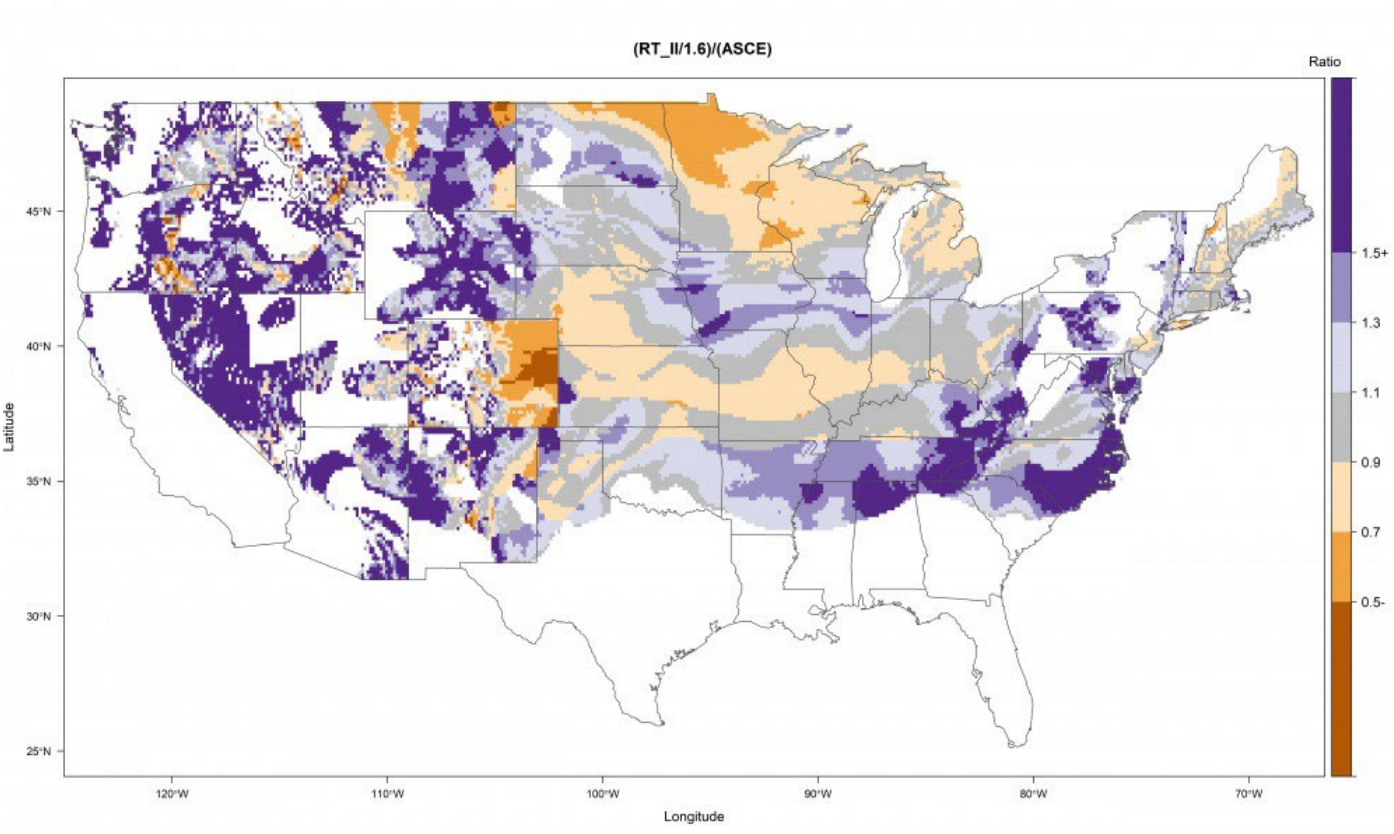


Figure 2. Ratio of ASCE 7-22 to ASCE 7-16 (Bean et al. 2021)

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.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because the IRC should be correlated with the new information from ASCE 7-22. The snow load were updated based on environmental data. The IRC types of units are all Risk Category 2, so since the IRC is a stand alone code, this additional information is not needed in the IRC. It was suggested that the risk category information be placed in the footnote regarding the ASCE-7 tool because it is needed information to use that tool. (Vote: 10-0)

Final Hearing Results

RB34-22	AS

RB35-22

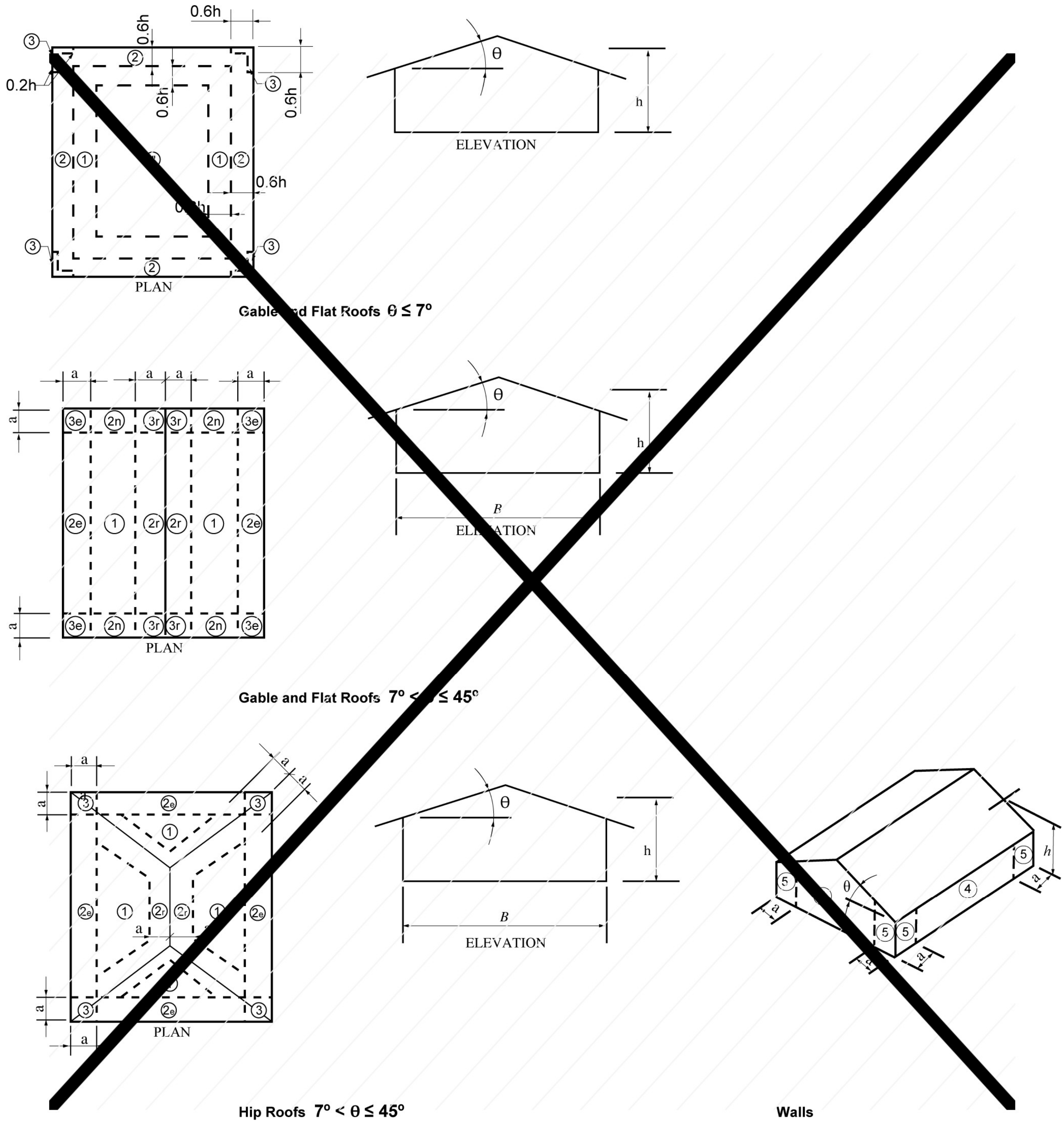
Original Proposal

IRC: FIGURE R301.2.1, TABLE R301.2.1(1), TABLE R301.2.1(2), FIGURE R301.2.1.1, FIGURE R301.2(2), R301.2.1.5, ASCE/SEI Chapter 44

Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net); 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)

2021 International Residential Code

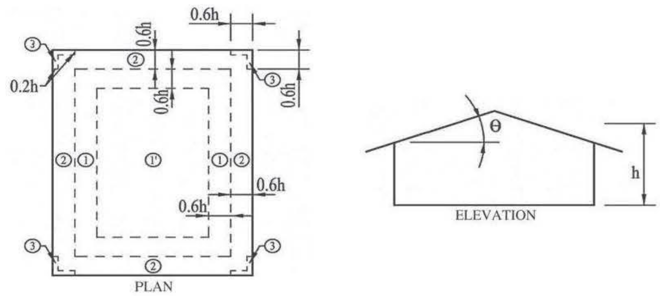
Delete and substitute as follows:



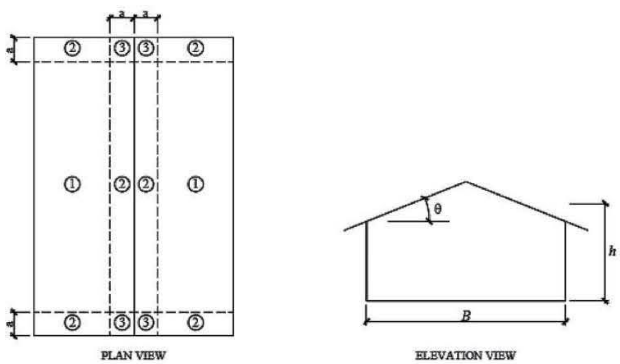
~~For SI: 1 foot = 304.8 mm, 1 degree = 0.0175 rad.~~

~~**Note:** a = 4 feet in all cases.~~

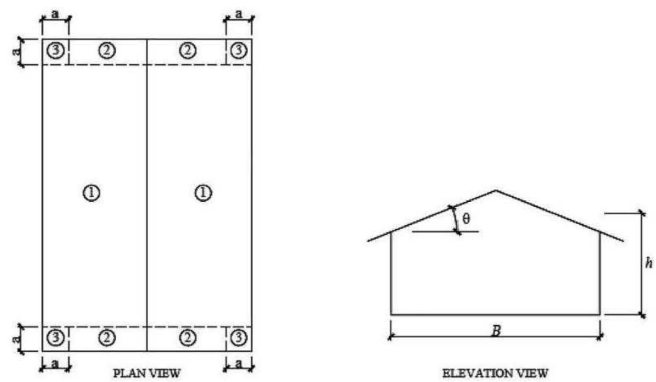
~~**FIGURE R301.2.1 COMPONENT AND CLADDING PRESSURE ZONES**~~



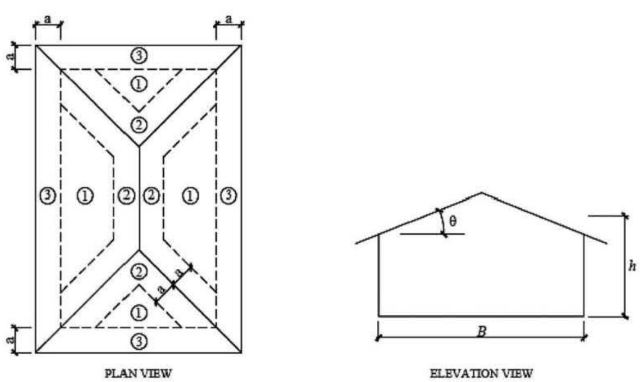
Gable and Flat Roofs θ ≤ 7°



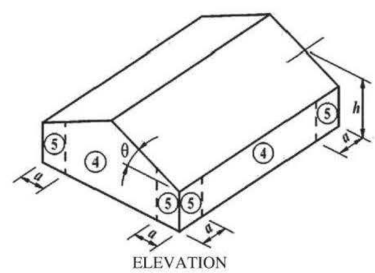
Gable Roofs 7° < θ ≤ 27°



Gable Roofs 27° < θ ≤ 45°



Hip Roofs 7° < θ ≤ 45°



Walls

For SI: 1 foot = 304.8mm, 1 degree = 0.0175 rad

Note: a = 4 feet in all cases

TABLE R301.2.1(1) COMPONENT AND CLADDING LOADS FOR A BUILDING WITH A MEAN ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (ASD) (psf) [a, b, c, d, e, f, g]

	ZONE	EFFECTIVE WIND AREAS (square feet)	ULTIMATE DESIGN WIND SPEED, *Vult*																									
			90		95		100		105		110		115		120		130		140		150		160		170		180	
			Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Flat and gable roof 0 to 7 degrees	1	10	3.6	-13.9	4	-15.5	4.4	-17.2	4.8	-19	5.3	-20.8	5.8	-22.7	6.3	-24.8	7.4	-29.1	8.6	-33.7	9.9	-38.7	11.2	-44	12.7	-49.7	14.2	-55.7
	1	20	3.3	-13	3.7	-14.5	4.1	-16	4.5	-17.7	5	-19.4	5.4	-21.2	5.9	-23.1	7	-27.1	8.1	-31.4	9.3	-36.1	10.5	-41.1	11.9	-46.4	13.3	-52
	1	50	3	-11.8	3.4	-13.1	3.8	-14.5	4.1	-16	4.5	-17.6	5	-19.2	5.4	-20.9	6.3	-24.5	7.4	-28.4	8.4	-32.6	9.6	-37.1	10.8	-41.9	12.2	-47
	1	100	2.8	-10.8	3.1	-12.1	3.5	-13.4	3.8	-14.7	4.2	-16.2	4.6	-17.7	5	-19.2	5.9	-22.6	6.8	-26.2	7.8	-30	8.9	-34.2	10	-38.6	11.3	-43.3
	2	10	3.6	-18.4	4	-20.5	4.4	-22.7	4.8	-25	5.3	-27.4	5.8	-30	6.3	-32.7	7.4	-38.3	8.6	-44.5	9.9	-51	11.2	-28.1	12.7	-65.6	14.2	-73.5
	2	20	3.3	-17.2	3.7	-19.2	4.1	-21.2	4.5	-23.4	5	-25.7	5.4	-28.1	5.9	-30.6	7	-35.9	8.1	-41.6	9.3	-47.8	10.5	-54.3	11.9	-61.4	13.3	-68.8
	2	50	3	-15.6	3.4	-17.4	3.8	-19.3	4.1	-21.3	4.5	-23.3	5	-25.5	5.4	-27.8	6.3	-32.6	7.4	-37.8	8.4	-43.4	9.6	-49.4	10.8	-55.8	12.2	-62.5
	2	100	2.8	-14.4	3.1	-16.1	3.5	-17.8	3.8	-19.7	4.2	-21.6	4.6	-23.6	5	-25.7	5.9	-30.1	6.8	-35	7.8	-40.1	8.9	-45.7	10	-51.5	11.3	-57.8
	3	10	3.6	-25	4	-27.9	4.4	-30.9	4.8	-34.1	5.3	-37.4	5.8	-40.9	6.3	-44.5	7.4	-52.2	8.6	-60.6	9.9	-69.6	11.2	-79.1	12.7	-89.4	14.2	-100.2
	3	20	3.3	-22.6	3.7	-25.2	4.1	-28	4.5	-30.8	5	-33.8	5.4	-37	5.9	-40.3	7	-47.2	8.1	-54.8	9.3	-62.9	10.5	-71.6	11.9	-80.8	13.3	-90.6
	3	50	3	-19.4	3.4	-21.7	3.8	-24	4.1	-26.5	4.5	-29	5	-31.7	5.4	-34.6	6.3	-40.6	7.4	-47	8.4	-54	9.6	-61.4	10.8	-69.4	12.2	-77.8
	3	100	2.8	-17.4	3.1	-19	3.5	-21	3.8	-23.2	4.2	-25.5	4.6	-27.8	5	-30.3	5.9	-35.6	6.8	-41.2	7.8	-47.3	8.9	-53.9	10	-60.8	11.3	-68.2
Gable roof > 7 to 20 degrees	1, 2e	10	5.4	-16.2	6	-18	6.7	-19.9	7.4	-22	8.1	-24.1	8.8	-26.4	9.6	-28.7	11.3	-33.7	13.1	39.1	15	44.9	17.1	-51	19.3	-57.6	21.6	-64.6
	1, 2e	20	4.9	-16.2	5.4	-18	6	-19.9	6.6	-22	7.2	-24.1	7.9	-26.4	8.6	-28.7	10.1	-33.7	11.7	-39.1	13.5	-44.9	15.3	-51	17.3	-57.6	19.4	-64.6
	1, 2e	50	4.1	-9.9	4.6	-11	5.1	-12.2	5.6	-13.4	6.1	-14.7	6.7	-16.1	7.3	-17.5	8.6	-20.6	10	-23.8	11.4	-27.4	13	-31.1	14.7	-35.2	16.4	-39.4
	1, 2e	100	3.6	-5	4	-5.6	4.4	-6.2	4.8	-6.9	5.3	-7.5	5.8	-8.2	6.3	-9	7.4	-10.5	8.6	-12.2	9.9	-14	11.2	-15.9	12.7	-18	14.2	-20.2
	2n, 2r, 3e	10	5.4	-23.6	6	-26.3	6.7	-29.1	7.4	-32.1	8.1	-35.2	8.8	-38.5	9.6	-41.9	11.3	-49.2	13.1	-57	15	-65.4	17.1	-74.5	19.3	-84.1	21.6	-94.2
	2n, 2r, 3e	20	4.9	-20.3	5.4	-22.7	6	-25.1	6.6	-27.7	7.2	-30.4	7.9	-33.2	8.6	-36.2	10.1	-42.4	11.7	-49.2	13.5	-56.5	15.3	-64.3	17.3	-72.6	19.4	-81.4
	2n, 2r, 3e	50	4.1	-16	4.6	-17.9	5.1	-19.8	5.6	-21.8	6.1	-24	6.7	-26.2	7.3	-28.5	8.6	-33.5	10	-38.8	11.4	-44.6	13	-50.7	14.7	-57.2	16.4	-64.2
	2n, 2r, 3e	100	3.6	-12.8	4	-14.3	4.4	-15.8	4.8	-17.4	5.3	-19.1	5.8	-20.9	6.3	-22.8	7.4	-26.7	8.6	-31	9.9	-35.6	11.2	-40.5	12.7	-45.7	14.2	-51.3
	3r	10	5.4	-28	6	-30.2	6.7	-34.6	7.4	-38.1	8.1	-41.8	8.8	-45.7	9.6	-49.8	11.3	-58.4	13.1	-67.8	15	-77.8	17.1	-88.5	19.3	-99.9	21.6	-112
	3r	20	4.9	-24	5.4	-26.7	6	-29.6	6.6	-32.7	7.2	-35.9	7.9	-39.2	8.6	-42.7	10.1	-50.1	11.7	-58.1	13.5	-66.7	15.3	-75.9	17.3	-85.6	19.4	-96
	3r	50	4.1	-18.7	4.6	-20.8	5.1	-23.1	5.6	-25.4	6.1	-27.9	6.7	-30.5	7.3	-33.2	8.6	-39	10	-45.2	11.4	-51.9	13	-59	14.7	-66.6	16.4	-74.7
	3r	100	3.6	-14.7	4	-16.3	4.4	-18.1	4.8	-20	5.3	-21.9	5.8	-24	6.3	-26.1	7.4	-30.6	8.6	-35.5	9.9	-40.8	11.2	-46.4	12.7	-52.3	14.2	-58.7
Gable roof > 20	1, 2e	10	6.5	-12.4	7.3	-13.9	8	-15.4	8.9	-16.9	9.7	-18.6	10.6	-20.3	11.6	-22.1	13.6	-26	15.8	-30.1	18.1	-34.6	20.6	-39.3	23.3	-44.4	26.1	-49.9

to 27 degrees	1, 2e	20	5.6	-12.4	6.3	-13.9	7	-15.4	7.7	-16.9	8.4	-18.6	9.2	-20.3	10	-22.1	11.7	-26	13.6	-30.1	15.6	-34.6	17.8	-39.3	20.1	-44.4	22.5	-49.8
	1, 2e	50	4.4	-10.6	5	-11.8	5.5	-3.1	6.1	-14.4	6.6	-15.8	7.3	-17.3	7.9	-18.8	9.3	-22.1	10.8	-25.6	12.3	-29.4	14	-33.5	15.9	-37.8	17.8	-42.4
	1, 2e	100	3.6	-9.1	4	-10.2	4.4	-11.3	4.8	-12.4	5.3	-13.6	5.8	-14.9	6.3	-16.2	7.4	-19	8.6	-22.1	9.9	-25.3	11.2	-28.8	12.7	-32.5	14.2	-36.5
	2n, 2r, 3e	10	6.5	-19.9	7.3	-22.1	8	-24.5	8.9	-27	9.7	-29.7	10.6	-32.4	11.6	-35.3	13.6	-41.4	15.8	-48	18.1	-55.2	20.6	-62.8	23.3	-70.8	26.1	-79.4
	2n, 2r, 3e	20	5.6	-17.4	6.3	-19.4	7	-21.5	7.7	-23.7	8.4	-26	9.2	-28.4	10	-31	11.7	-36.3	13.6	-42.1	15.6	-48.4	17.8	-55	20.1	-62.1	22.5	-69.6
	2n, 2r, 3e	50	4.4	-14.2	5	-15.8	5.5	-17.5	6.1	-19.3	6.6	-21.1	7.3	-23.1	7.9	-25.2	9.3	-29.5	10.8	-34.2	12.3	-39.3	14	-44.7	15.9	-50.5	17.8	-56.6
	2n, 2r, 3e	100	3.6	-11.7	4	-13	4.4	-14.5	4.8	-15.9	5.3	-17.5	5.8	-19.1	6.3	-20.8	7.4	-24.4	8.6	-28.3	9.9	-32.5	11.2	-37	12.7	-41.8	14.2	-46.8
	3r	10	6.5	-23.6	7.3	-26.3	8	-29.1	8.9	-32.1	9.7	-35.2	10.6	-38.5	11.6	-41.9	13.6	-49.2	15.8	-57	18.1	-65.4	20.6	-74.5	23.3	-84.1	26.1	-94.2
	3r	20	5.6	-19.9	6.3	-22.1	7	-24.5	7.7	-27	8.4	-29.7	9.2	-32.4	10	-35.3	11.7	-41.4	13.6	-48	15.6	-55.2	17.8	-62.8	20.1	-70.8	22.5	-79.4
	3r	50	4.4	-14.7	5	-16.3	5.5	-18.1	6.1	-20	6.6	-21.9	7.3	-24	7.9	-26.1	9.3	-30.6	10.8	-35.5	12.3	-40.8	14	-46.4	15.9	-52.3	17.8	-58.7
	3r	100	3.6	-14.7	4	-16.3	4.4	-18.1	4.8	-20	5.3	-21.9	5.8	-24	6.3	-26.1	7.4	-30.6	8.6	-35.5	9.9	-40.8	11.2	-46.4	12.7	-52.3	14.2	-58.7
Gable roof > 27 to 45 degrees	1, 2e, 2r	10	8	-14.7	8.9	-16.3	9.9	-18.1	10.9	-20	12	-21.9	13.1	-24	14.2	-26.1	16.7	-30.6	19.4	-35.5	22.2	-40.8	25.3	-16.4	28.5	-52.3	32	-58.7
	1, 2e, 2r	20	7.1	-12.4	7.9	-13.9	8.8	-15.4	9.7	-16.9	10.6	-18.6	11.6	-20.3	12.6	-22.1	14.8	-26	17.2	-30.1	19.8	-34.6	22.5	-39.3	25.4	-44.4	28.5	-49.8
	1, 2e, 2r	50	5.9	-9.5	6.6	-10.6	7.3	-11.7	8.1	-12.9	8.9	-14.2	9.7	-15.5	10.5	-16.9	12.4	-19.8	14.3	-22.9	16.5	-26.3	18.7	-30	21.1	-33.8	23.7	-37.9
	1, 2e, 2r	100	5	-7.3	5.6	-8.1	6.2	-9	6.9	-9.9	7.5	-10.8	8.2	-11.9	9	-12.9	10.5	-15.1	12.2	-17.6	14	-20.2	15.9	-22.9	18	-25.9	20.2	-29
	2n, 3r	10	8	-16.2	8.9	-18	9.9	-19.9	10.9	-22	12	-24.1	13.1	-26.4	-14.2	-28.7	16.7	-33.7	19.4	-39.1	22.2	-44.9	25.3	-51	28.5	-57.6	32	-64.6
	2n, 3r	20	7.1	-14.4	7.9	-16.1	8.8	-17.8	9.7	-19.7	10.6	-21.6	11.6	-23.6	12.6	-25.7	14.8	-30.1	17.2	-34.9	19.8	-40.1	22.5	-45.6	25.4	-51.5	28.5	-57.8
	2n, 3r	50	5.9	-12.2	6.6	-13.5	7.3	-15	8.1	-16.5	8.9	-18.2	9.7	-19.9	10.5	-21.6	12.4	-25.4	14.3	-29.4	16.5	-33.8	18.7	-38.4	21.1	-43.4	23.7	-48.6
	2n, 3r	100	5	-10.4	5.6	-11.6	6.2	-12.9	6.9	-14.2	7.5	-15.6	8.2	-17.1	9	-18.6	10.5	-21.8	12.2	-25.3	14	-29	15.9	-33	18	-37.3	20	-41.8
	3e	10	8	-19.9	8.9	-22.1	9.9	-24.5	10.9	-27	12	-29.7	13.1	-32.4	14.2	-35.3	16.7	-41.4	19.4	-48	22.2	-55.2	25.3	-62.8	28.8	-70.8	32	-79.4
	3e	20	7.1	-17.6	7.9	-19.6	8.8	-21.8	9.7	-24	10.6	-26.3	11.6	-28.8	12.6	-31.3	14.8	-36.8	17.2	-42.7	19.8	-49	22.5	-55.7	25.4	-62.9	28.5	-70.5
	3e	50	5.9	-14.7	6.6	-16.3	7.3	-18.1	8.1	-20	8.9	-21.9	9.7	-24	10.5	-26.1	12.4	-30.6	14.3	-35.5	16.6	-40.8	18.7	-46.4	21.1	-52.3	23.7	-58.7
	3e	100	5	-12.4	5.6	-13.9	6.2	-15.4	6.9	-16.9	7.5	-18.6	8.2	-20.3	9	-22.1	10.5	-26	12.2	-30.1	14	-34.6	15.9	-39.3	18	-44.4	20.2	-49.8
Hipped roof > 7 to 20 degreesg	1	10	6.5	-14.7	7.3	-16.3	8	-18.1	8.9	-20	9.7	-21.9	10.6	-24	11.6	-26.1	13.6	-30.6	15.8	-35.5	18.1	-40.8	20.6	-46.4	23.3	-52.3	26.1	-58.7
	1	20	5.6	-14.7	6.3	-16.3	7	-18.1	7.7	-20	8.4	-21.9	9.2	-24	10	-26.1	11.7	-30.6	13.6	-35.5	15.6	-40.8	17.8	-46.4	20.1	-52.3	22.5	-58.7
	1	50	4.4	-11.3	5	-12.6	5.5	-14	6.1	-15.4	6.6	-16.9	7.3	-18.5	7.9	-20.2	9.3	-23.7	10.8	-27.4	12.3	-31.5	14	-35.8	15.9	-40.4	17.8	-45.3
	1	100	3.6	-8.7	4	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2	-27.6	12.7	-31.2	14.2	-35
	2r	10	6.5	-19.1	7.3	-21.3	8	-23.6	8.9	-26	9.7	-28.6	10.6	-31.2	11.6	-34	13.6	-39.9	15.8	-46.3	18.1	-53.1	20.6	-60.4	23.3	-68.2	26.1	-76.5
	2r	20	5.6	-17.2	6.3	-19.2	7	-21.3	7.7	-23.4	8.4	-25.7	9.2	-28.1	10	-30.6	11.7	-35.9	13.6	-41.7	15.6	-47.9	17.8	-54.4	20.1	-61.5	22.5	-68.9
	2r	50	4.4	-14.7	5	-16.4	5.5	-18.2	6.1	-20	6.6	-22	7.3	-24	7.9	-26.1	9.3	-30.7	10.8	-35.6	12.3	-40.9	14	-46.5	15.9	-52.5	17.8	-58.8
	2r	100	3.6	-12.8	4	-14.3	4.4	-15.8	4.8	-17.4	5.3	-19.1	5.8	-20.9	6.3	-22.8	7.4	-26.7	8.6	-31	9.9	-35.6	11.2	-40.5	12.7	-45.7	14.2	-51.3
	2e, 3	10	6.5	-20.6	7.3	-22.9	8	-25.4	8.9	-28	9.7	-30.8	10.6	-33.6	11.6	-36.6	13.6	-43	15.8	-49.8	18.1	-57.2	20.6	-65.1	23.3	-73.5	26.1	-82.4
	2e, 3	20	5.6	-18.5	6.3	-20.6	7	-22.9	7.7	-25.2	8.4	-27.7	9.2	-30.3	10	-32.9	11.7	-38.7	13.6	-44.8	15.6	-51.5	17.8	-58.6	20.1	-66.1	22.5	-74.1

	2e, 3	50	4.4	-15.8	5	-17.6	5.5	-19.5	6.1	-21.5	6.6	-23.6	7.3	-25.8	7.9	-28	9.3	-32.9	10.8	-38.2	12.3	-43.8	14	-49.9	15.9	-56.3	17.8	-63.1
	2e, 3	100	3.6	-13.7	4	-15.3	4	-16.9	4.8	-18.7	5.3	-20.5	5.8	-22.4	6.3	-24.4	7.4	-28.6	8.6	-33.2	9.9	-38.1	11.2	-43.3	12.7	-48.9	14.2	-54.8
Hipped roof > 20 to 27 degrees	1	10	6.5	-11.7	7.3	-13	8	-14.5	8.9	-15.9	9.7	-17.5	10.6	-19.1	11.6	-20.8	13.6	-24.4	15.8	-28.3	18.1	-32.5	20.6	-37	23.3	-41.8	26.1	-46.8
	1	20	5.6	-10.4	6.3	-11.6	7	-12.8	7.7	-14.1	8.4	-15.5	9.2	-16.9	10	-18.4	11.7	-21.6	13.6	-25.1	15.6	-28.8	17.8	-32.8	20.1	-37	22.5	-41.5
	1	50	4.4	-8.6	5	-9.6	5.5	-10.6	6.1	-11.7	6.6	-12.8	7.3	-14	7.9	-15.3	9.3	-17.9	10.8	-20.8	12.3	-23.9	14	-27.2	15.9	-30.7	17.8	-34.4
	1	100	3.6	-7.3	4	-8.1	4.4	-9	4.8	-9.9	5.3	-10.8	5.8	-11.9	6.3	-12.9	7.4	-15.1	8.6	-17.6	9.9	-20.2	11.2	-22.9	12.7	-25.9	14.2	-29
	2e, 2r, 3	10	6.5	-16.2	7.3	-18	8	-19.9	8.9	-22	9.7	-24.1	10.6	-26.4	11.6	-28.7	13.6	-33.7	15.8	-39.1	18.1	-44.9	20.6	-51	23.3	-57.6	26.1	-64.6
	2e, 2r, 3	20	5.6	-14.4	6.3	-16.1	7	-17.8	7.7	-19.7	8.4	-21.6	9.2	-23.6	10	-25.7	11.7	-30.1	13.6	-34.9	15.6	-40.1	17.8	-45.6	20.1	-51.5	22.5	-57.8
	2e, 2r, 3	50	4.4	-12.2	5	-13.5	5.5	-15	6.1	-16.5	6.6	-18.2	7.3	-19.9	7.9	-21.6	9.3	-25.4	10.8	-29.4	12.3	-33.8	14	-38.4	15.9	-43.4	17.8	-48.6
	2e, 2r, 3	100	3.6	-10.4	4	-11.6	4.4	-12.9	4.8	-14.2	5.3	-15.6	5.8	-17.1	6.3	-18.6	7.4	-21.8	8.6	-25.3	9.9	-29	11.2	-33	12.7	-37.3	14.2	-41.8
Hipped roof > 27 to 45 degrees	1	10	6.2	-12.4	6.9	-13.9	7.7	-15.4	8.5	-16.9	9.3	-18.6	10.2	-20.3	11.1	-22.1	13	-26	15.1	-30.1	17.3	-34.6	19.7	-39.3	22.2	-44.4	24.9	-49.8
	1	20	5.4	-11	6	-12.3	6.7	-13.6	7.4	-15	8.1	-16.5	8.9	-18	9.6	-19.6	11.3	-23	13.1	-26.7	15.1	-30.7	17.1	-34.9	19.4	-39.4	21.7	-44.2
	1	50	4.4	-9.2	4.9	-10.2	5.4	-11.3	5.9	-12.5	6.5	-13.7	7.1	-15	7.7	-16.3	9.1	-19.2	10.5	-22.2	12.1	-25.5	13.8	-29	15.5	-32.8	17.4	-36.7
	1	100	3.6	-7.8	4	-8.7	4.4	-9.6	4.8	-10.6	5.3	-11.6	5.8	-12.7	6.3	-13.8	7.4	-16.2	8.6	-18.8	9.9	-21.6	11.2	-24.6	12.7	-27.8	14.2	-31.1
	2e	10	6.2	-14.8	6.9	-16.5	7.7	-18.3	8.5	-20.2	9.3	-22.1	10.2	-24.2	11.1	-26.3	13	-30.9	15.1	-35.9	17.3	-41.2	19.7	-46.8	22.2	-52.9	24.9	-59.3
	2e	20	5.4	-11.7	6	-13	6.7	-14.5	7.4	-15.9	8.1	-17.5	8.9	-19.1	9.6	-20.8	11.3	-24.4	13.1	-28.3	15.1	-32.5	17.1	-37	19.4	-41.8	21.7	-46.8
	2e	50	4.4	-7.3	4.9	-8.1	5.4	-9	5.9	-9.9	6.5	-10.8	7.1	-11.9	7.7	-12.9	9.1	-15.1	10.5	-17.6	12.1	-20.2	13.8	-22.9	15.5	-25.9	17.4	-29
	2e	100	3.6	-7.3	4	-8.1	4.4	-9	4.8	-9.9	5.3	-10.8	5.8	-11.9	6.3	-12.9	7.4	-15.1	8.6	-17.6	9.9	-20.2	11.2	-22.9	12.7	-25.9	14.2	-29
	2r	10	6.2	-18.7	6.9	-20.9	7.7	-23.1	8.5	-25.5	9.3	-28	10.2	-30.6	11.1	-33.3	13	-39.1	15.1	-45.4	17.3	-52.1	19.7	-59.2	22.2	-66.9	24.9	-75
	2r	20	5.4	-15.7	6	-17.5	6.7	-19.4	7.4	-21.4	8.1	-23.5	8.9	-25.7	9.6	-28	11.3	-32.8	13.1	-38.1	15.1	-43.7	17.1	-49.8	19.4	-56.2	21.7	-63
	2r	50	4.4	-11.7	4.9	-13.1	5.4	-14.5	5.9	-16	6.5	-17.5	7.1	-19.2	7.7	-20.9	9.1	-24.5	10.5	-28.4	12.1	-32.6	13.8	-37.1	15.5	-41.9	17.4	-47
	2r	100	3.6	-8.7	4	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2	-27.6	12.7	-31.2	14.2	-35
	3	10	6.2	-20	6.9	-22.3	7.7	-24.7	8.5	-27.2	9.3	-29.9	10.2	-32.7	11.1	-35.6	13	-41.7	15.1	-48.4	17.3	-55.6	19.7	-63.2	22.2	-71.4	24.9	-80
	3	20	5.4	-15	6	-16.8	6.7	-18.6	7.4	-20.5	8.1	-22.5	8.9	-24.6	9.6	-26.7	11.3	-31.4	13.1	-36.4	15.1	-41.8	17.1	-47.5	19.4	-53.7	21.7	-60.2
	3	50	4.4	-8.7	4.9	-9.7	5.4	-10.8	5.9	-11.9	6.5	-13.1	7.1	-14.3	7.7	-15.5	9.1	-18.2	10.5	-21.2	12.1	-24.3	13.8	-27.6	15.5	-31.2	17.4	-35
	3	100	3.6	-8.7	4	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2	-27.6	12.7	-31.2	14.2	-35
Wall	4	10	8.7	-9.5	9.7	-10.6	10.8	-11.7	11.9	-12.9	13.1	-14.2	14.3	-15.5	15.5	-16.9	18.2	-19.8	21.2	-22.9	24.3	-26.3	27.6	-30	31.2	-33.8	35	-37.9
	4	20	8.3	-9.1	9.3	-10.1	10.3	-11.2	11.4	-12.4	12.5	-13.6	13.6	-14.8	14.8	-16.2	17.4	-19	20.2	-22	23.2	-25.3	26.4	-28.7	29.8	-32.4	33.4	-36.4
	4	50	7.8	-8.6	8.7	-9.5	9.7	-10.6	10.7	-11.7	11.7	-12.8	12.8	-14	13.9	-15.2	16.3	-17.9	18.9	-20.7	21.7	-23.8	24.7	-27.1	27.9	-30.6	31.3	-34.3
	4	100	7.4	-8.2	8.3	-9.1	9.2	-10.1	10.1	-11.1	11.1	-12.2	12.1	-13.3	13.2	-14.5	15.5	-17.1	18	-19.8	20.6	-22.7	23.5	-25.8	26.5	-29.2	29.7	-32.7
	4	500	6.5	-7.3	7.3	-8.1	8	-9	8.9	-9.9	9.7	-10.8	10.6	-11.9	11.6	-12.9	13.5	-15.1	15.8	-17.6	18.1	-20.2	20.6	-22.9	23.3	-25.9	26.1	-29
	5	10	8.7	-11.7	9.7	-13	10.8	-14.5	11.9	-15.9	13.1	-17.5	14.3	-19.1	15.5	-20.8	18.2	-24.4	21.2	-28.3	24.3	-32.5	27.6	-37	31.2	-41.8	35	-46.8
	5	20	8.3	-10.9	9.3	-12.2	10.3	-13.5	11.4	-14.9	12.5	-16.3	13.6	-17.8	14.8	-19.4	17.4	-22.8	20.2	-26.4	23.2	-30.3	26.4	-34.5	29.8	-39	33.4	-43.7
	5	50	7.8	-9.9	8.7	-11	9.7	-12.2	10.7	-13.4	11.7	-14.7	12.8	-16.1	13.9	-17.5	16.3	-20.6	18.9	-23.9	21.7	-27.4	24.7	-31.2	27.9	-35.2	31.3	-39.5
	5	100	7.4	-9.1	8.3	-10.1	9.2	-11.2	10.1	-12.4	11.1	-13.6	12.1	-14.8	13.2	-16.1	15.5	-19	18	-22	20.6	-25.2	23.5	-28.7	26.5	-32.4	29.7	-36.3
	5	500	6.5	-7.3	7.3	-8.1	8	-9	8.9	-9.9	9.7	-10.8	10.6	-11.9	11.6	-12.9	13.6	-15.1	15.8	-17.6	18.1	-20.2	20.6	-22.9	23.3	-25.9	26.1	-29

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. The effective wind area shall be equal to the span length multiplied by an effective width. This width shall be not less than one-third the span length. For cladding fasteners, the effective wind areas shall not be greater than the area that is tributary to an individual fasteners.

b. For effective areas between those given, the load shall be interpolated or the load associated with the lower effective areas shall be used.

c. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table R301.2.1(2).

d. See Figure R318.4 for locations of termite infestation probability zones.

e. Plus and minus signs signify pressures acting toward and away from the building surfaces.

f. Positive and negative design wind pressures shall not be less than 10 psf.

g. Where the ratio of the building mean roof height to the building length or width is less than 0.8, uplift loads shall be permitted to be calculated in accordance with ASCE 7.

TABLE R301.2.1(1) COMPONENT AND CLADDING LOADS FOR A BUILDING WITH A MEAN ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (ASD) (psf) [a, b, c, d, e, f, g]

-	Zone	Effective Wind Area	90		95		100		105		110		115		120		130		140		150		160		170		180	
			POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG
Gable Roof < 7	1,1'	10	3.6	-13.9	4.0	-15.5	4.4	-17.2	4.8	-19.0	5.3	-20.8	5.8	-22.7	6.3	-24.8	7.4	-29.1	8.6	-33.7	9.9	-38.7	11.2	-44.0	12.7	-49.7	14.2	-55.7
	1,1'	20	3.3	-12.4	3.7	-13.8	4.1	-15.3	4.5	-16.8	5.0	-18.5	5.4	-20.2	5.9	-22.0	7.0	-25.8	8.1	-29.9	9.3	-34.4	10.5	-39.1	11.9	-44.1	13.3	-49.5
	1,1'	50	3.0	-10.3	3.4	-11.5	3.8	-12.7	4.1	-14.0	4.5	-15.4	5.0	-16.8	5.4	-18.3	6.3	-21.5	7.4	-24.9	8.4	-28.6	9.6	-32.5	10.8	-36.7	12.2	-41.2
	1,1'	100	2.8	-8.7	3.1	-9.7	3.5	-10.8	3.8	-11.9	4.2	-13.1	4.6	-14.3	5.0	-15.5	5.9	-18.2	6.8	-21.2	7.8	-24.3	8.9	-27.6	10.0	-31.2	11.3	-35.0
	2	10	3.6	-18.4	4.0	-20.5	4.4	-22.7	4.8	-25.0	5.3	-27.4	5.8	-30.0	6.3	-32.7	7.4	-38.3	8.6	-44.5	9.9	-51.0	11.2	-58.1	12.7	-65.6	14.2	-73.5
	2	20	3.3	-16.4	3.7	-18.2	4.1	-20.2	4.5	-22.3	5.0	-24.5	5.4	-26.7	5.9	-29.1	7.0	-34.2	8.1	-39.6	9.3	-45.5	10.5	-51.8	11.9	-58.4	13.3	-65.5
	2	50	3.0	-13.7	3.4	-15.3	3.8	-16.9	4.1	-18.7	4.5	-20.5	5.0	-22.4	5.4	-24.4	6.3	-28.6	7.4	-33.2	8.4	-38.1	9.6	-43.3	10.8	-48.9	12.2	-54.8
	2	100	2.8	-11.7	3.1	-13.0	3.5	-14.5	3.8	-15.9	4.2	-17.5	4.6	-19.1	5.0	-20.8	5.9	-24.4	6.8	-28.3	7.8	-32.5	8.9	-37.0	10.0	-41.8	11.3	-46.8
	3	10	3.6	-25.0	4.0	-27.9	4.4	-30.9	4.8	-34.1	5.3	-37.4	5.8	-40.9	6.3	-44.5	7.4	-52.2	8.6	-60.6	9.9	-69.6	11.2	-79.1	12.7	-89.4	14.2	-100.2
	3	20	3.3	-21.0	3.7	-23.4	4.1	-26.0	4.5	-28.6	5.0	-31.4	5.4	-34.4	5.9	-37.4	7.0	-43.9	8.1	-50.9	9.3	-58.4	10.5	-66.5	11.9	-75.1	13.3	-84.2
	3	50	3.0	-15.7	3.4	-17.5	3.8	-19.4	4.1	-21.4	4.5	-23.5	5.0	-25.6	5.4	-27.9	6.3	-32.8	7.4	-38.0	8.4	-43.6	9.6	-49.6	10.8	-56.0	12.2	-62.8
	3	100	2.8	-11.7	3.1	-13.0	3.5	-14.5	3.8	-15.9	4.2	-17.5	4.6	-19.1	5.0	-20.8	5.9	-24.4	6.8	-28.3	7.8	-32.5	8.9	-37.0	10.0	-41.8	11.3	-46.8
Gable Roof > 7 to 20 degrees	1	10	5.8	-16.2	6.4	-18.0	7.1	-19.9	7.9	-22.0	8.6	-24.1	9.4	-26.4	10.3	-28.7	12.1	-33.7	14.0	-39.1	16.1	-44.9	18.3	-51.0	20.6	-57.6	23.1	-64.6
	1	20	5.3	-13.9	5.9	-15.5	6.5	-17.1	7.2	-18.9	7.9	-20.7	8.6	-22.7	9.4	-24.7	11.0	-29.0	12.7	-33.6	14.6	-38.6	16.6	-43.9	18.8	-49.5	21.1	-55.5
	1	50	4.6	-10.9	5.1	-12.1	5.7	-13.4	6.2	-14.8	6.8	-16.3	7.5	-17.8	8.2	-19.4	9.6	-22.7	11.1	-26.4	12.7	-30.3	14.5	-34.4	16.4	-38.9	18.3	-43.6
	1	100	4.1	-8.6	4.5	-9.6	5.0	-10.7	5.5	-11.7	6.1	-12.9	6.6	-14.1	7.2	-15.3	8.5	-18.0	9.8	-20.9	11.3	-24.0	12.9	-27.3	14.5	-30.8	16.3	-34.5
	2	10	5.8	-21.3	6.4	-23.8	7.1	-26.3	7.9	-29.0	8.6	-31.9	9.4	-34.8	10.3	-37.9	12.1	-44.5	14.0	-51.6	16.1	-59.3	18.3	-67.4	20.6	-76.1	23.1	-85.4
	2	20	5.3	-18.4	5.9	-20.5	6.5	-22.7	7.2	-25.1	7.9	-27.5	8.6	-30.1	9.4	-32.8	11.0	-38.4	12.7	-44.6	14.6	-51.2	16.6	-58.2	18.8	-65.7	21.1	-73.7
	2	50	4.6	-14.6	5.1	-16.2	5.7	-18.0	6.2	-19.8	6.8	-21.8	7.5	-23.8	8.2	-25.9	9.6	-30.4	11.1	-35.3	12.7	-40.5	14.5	-46.1	16.4	-52.0	18.3	-58.3
	2	100	4.1	-11.7	4.5	-13.0	5.0	-14.4	5.5	-15.9	6.1	-17.4	6.6	-19.0	7.2	-20.7	8.5	-24.3	9.8	-28.2	11.3	-32.4	12.9	-36.8	14.5	-41.6	16.3	-46.6
	3	10	5.8	-28.0	6.4	-31.2	7.1	-34.6	7.9	-38.1	8.6	-41.8	9.4	-45.7	10.3	-49.8	12.1	-58.4	14.0	-67.8	16.1	-77.8	18.3	-88.5	20.6	-99.9	23.1	-112.0
	3	20	5.3	-24.0	5.9	-26.7	6.5	-29.6	7.2	-32.7	7.9	-35.8	8.6	-39.2	9.4	-42.7	11.0	-50.1	12.7	-58.1	14.6	-66.6	16.6	-75.8	18.8	-85.6	21.1	-96.0
	3	50	4.6	-18.7	5.1	-20.8	5.7	-23.1	6.2	-25.4	6.8	-27.9	7.5	-30.5	8.2	-33.2	9.6	-39.0	11.1	-45.2	12.7	-51.9	14.5	-59.1	16.4	-66.7	18.3	-74.7
	3	100	4.1	-14.7	4.5	-16.3	5.0	-18.1	5.5	-20.0	6.1	-21.9	6.6	-24.0	7.2	-26.1	8.5	-30.6	9.8	-35.5	11.3	-40.8	12.9	-46.4	14.5	-52.3	16.3	-58.7
Gable Roof > 20 to 27 degrees	1	10	5.8	-12.4	6.4	-13.9	7.1	-15.4	7.9	-16.9	8.6	-18.6	9.4	-20.3	10.3	-22.1	12.1	-26.0	14.0	-30.1	16.1	-34.6	18.3	-39.3	20.6	-44.4	23.1	-49.8
	1	20	5.3	-11.2	5.9	-12.5	6.5	-13.9	7.2	-15.3	7.9	-16.8	8.6	-18.4	9.4	-20.0	11.0	-23.5	12.7	-27.2	14.6	-31.2	16.6	-35.5	18.8	-40.1	21.1	-45.0
	1	50	4.6	-9.7	5.1	-10.8	5.7	-11.9	6.2	-13.1	6.8	-14.4	7.5	-15.8	8.2	-17.2	9.6	-20.2	11.1	-23.4	12.7	-26.8	14.5	-30.5	16.4	-34.5	18.3	-38.6
	1	100	4.1	-8.5	4.5	-9.4	5.0	-10.4	5.5	-11.5	6.1	-12.6	6.6	-13.8	7.2	-15.0	8.5	-17.7	9.8	-20.5	11.3	-23.5	12.9	-26.7	14.5	-30.2	16.3	-33.8
	2	10	5.8	-19.9	6.4	-22.1	7.1	-24.5	7.9	-27.0	8.6	-29.7	9.4	-32.4	10.3	-35.3	12.1	-41.4	14.0	-48.0	16.1	-55.2	18.3	-62.8	20.6	-70.8	23.1	-79.4
	2	20	5.3	-17.0	5.9	-18.9	6.5	-20.9	7.2	-23.1	7.9	-25.3	8.6	-27.7	9.4	-30.1	11.0	-35.4	12.7	-41.0	14.6	-47.1	16.6	-53.6	18.8	-60.5	21.1	-67.8
	2	50	4.6	-13.1	5.1	-14.6	5.7	-16.2	6.2	-17.9	6.8	-19.6	7.5	-21.4	8.2	-23.3	9.6	-27.4	11.1	-31.8	12.7	-36.5	14.5	-41.5	16.4	-46.8	18.3	-52.5
	2	100	4.1	-10.2	4.5	-11.4	5.0	-12.6	5.5	-13.9	6.1	-15.3	6.6	-16.7	7.2	-18.2	8.5	-21.3	9.8	-24.7	11.3	-28.4	12.9	-32.3	14.5	-36.5	16.3	-40.9
	3	10	5.8	-23.6	6.4	-26.3	7.1	-29.1	7.9	-32.1	8.6	-35.2	9.4	-38.5	10.3	-41.9	12.1	-49.2	14.0	-57.0	16.1	-65.4	18.3	-74.5	20.6	-84.1	23.1	-94.2
	3	20	5.3	-20.0	5.9	-22.3	6.5	-24.7	7.2	-27.2	7.9	-29.9	8.6	-32.6	9.4	-35.5	11.0	-41.7	12.7	-48.4	14.6	-55.5	16.6	-63.2	18.8	-71.3	21.1	-80.0

	3	50	4.6	-15.3	5.1	-17.0	5.7	-18.9	6.2	-20.8	6.8	-22.8	7.5	-24.9	8.2	-27.2	9.6	-31.9	11.1	-37.0	12.7	-42.4	14.5	-48.3	16.4	-54.5	18.3	-61.1
	3	100	4.1	-11.7	4.5	-13.0	5.0	-14.5	5.5	-15.9	6.1	-17.5	6.6	-19.1	7.2	-20.8	8.5	-24.4	9.8	-28.3	11.3	-32.5	12.9	-37.0	14.5	-41.8	16.3	-46.8
Gable Roof > 27 to 45 degrees	1	10	8.0	-14.7	8.9	-16.3	9.9	-18.1	10.9	-20.0	12.0	-21.9	13.1	-24.0	14.2	-26.1	16.7	-30.6	19.4	-35.5	22.2	-40.8	25.3	-46.4	28.5	-52.3	32.0	-58.7
	1	20	7.3	-12.4	8.2	-13.9	9.0	-15.4	10.0	-16.9	10.9	-18.6	11.9	-20.3	13.0	-22.1	15.3	-26.0	17.7	-30.1	20.3	-34.6	23.1	-39.3	26.1	-44.4	29.3	-49.8
	1	50	6.4	-9.5	7.1	-10.6	7.9	-11.7	8.7	-12.9	9.6	-14.2	10.5	-15.5	11.4	-16.9	13.4	-19.8	15.5	-23.0	17.8	-26.4	20.3	-30.0	22.9	-33.9	25.6	-38.0
	1	100	5.7	-7.3	6.4	-8.1	7.1	-9.0	7.8	-9.9	8.6	-10.8	9.3	-11.9	10.2	-12.9	11.9	-15.1	13.9	-17.6	15.9	-20.2	18.1	-22.9	20.4	-25.9	22.9	-29.0
	2	10	8.0	-16.2	8.9	-18.0	9.9	-19.9	10.9	-22.0	12.0	-24.1	13.1	-26.4	14.2	-28.7	16.7	-33.7	19.4	-39.1	22.2	-44.9	25.3	-51.0	28.5	-57.6	32.0	-64.6
	2	20	7.3	-14.4	8.2	-16.1	9.0	-17.8	10.0	-19.7	10.9	-21.6	11.9	-23.6	13.0	-25.7	15.3	-30.1	17.7	-34.9	20.3	-40.1	23.1	-45.6	26.1	-51.5	29.3	-57.7
	2	50	6.4	-12.2	7.1	-13.6	7.9	-15.0	8.7	-16.6	9.6	-18.2	10.5	-19.9	11.4	-21.6	13.4	-25.4	15.5	-29.5	17.8	-33.8	20.3	-38.5	22.9	-43.4	25.6	-48.7
	2	100	5.7	-10.5	6.4	-11.7	7.1	-12.9	7.8	-14.2	8.6	-15.6	9.3	-17.1	10.2	-18.6	11.9	-21.8	13.9	-25.3	15.9	-29.0	18.1	-33.0	20.4	-37.3	22.9	-41.8
	3	10	8.0	-19.9	8.9	-22.1	9.9	-24.5	10.9	-27.0	12.0	-29.7	13.1	-32.4	14.2	-35.3	16.7	-41.4	19.4	-48.0	22.2	-55.2	25.3	-62.8	28.5	-70.8	32.0	-79.4
	3	20	7.3	-17.3	8.2	-19.3	9.0	-21.3	10.0	-23.5	10.9	-25.8	11.9	-28.2	13.0	-30.7	15.3	-36.1	0.0	-41.8	20.3	-48.0	23.1	-54.6	26.1	-61.7	29.3	-69.1
	3	50	6.4	-13.9	7.1	-15.5	7.9	-17.1	8.7	-18.9	9.6	-20.7	10.5	-22.7	11.4	-24.7	13.4	-29.0	15.5	-33.6	17.8	-38.6	20.3	-43.9	22.9	-49.5	25.6	-55.5
	3	100	5.7	-11.3	6.4	-12.6	7.1	-14.0	7.8	-15.4	8.6	-16.9	9.3	-18.5	10.2	-20.1	11.9	-23.6	13.9	-27.4	15.9	-31.4	18.1	-35.8	20.4	-40.4	22.9	-45.3
Hip Roof > 7 to 20 degrees	1	10	6.5	-14.7	7.3	-16.3	8.0	-18.1	8.9	-20.0	9.7	-21.9	10.6	-24.0	11.6	-26.1	13.6	-30.6	15.8	-35.5	18.1	-40.8	20.6	-46.4	23.3	-52.3	26.1	-58.7
	1	20	5.6	-13.0	6.3	-14.4	6.9	-16.0	7.7	-17.6	8.4	-19.4	9.2	-21.2	10.0	-23.0	11.7	-27.0	13.6	-31.3	15.6	-36.0	17.8	-40.9	20.1	-46.2	22.5	-51.8
	1	50	4.4	-10.7	5.0	-11.9	5.5	-13.2	6.1	-14.5	6.6	-16.0	7.3	-17.5	7.9	-19.0	9.3	-22.3	10.8	-25.9	12.4	-29.7	14.1	-33.8	15.9	-38.1	17.8	-42.8
	1	100	3.6	-9.0	4.0	-10.0	4.4	-11.1	4.8	-12.2	5.3	-13.4	5.8	-14.7	6.3	-16.0	7.4	-18.7	8.6	-21.7	9.9	-24.9	11.2	-28.4	12.7	-32.0	14.2	-35.9
	2	10	6.5	-19.1	7.3	-21.3	8.0	-23.6	8.9	-26.0	9.7	-28.6	10.6	-31.2	11.6	-34.0	13.6	-39.9	15.8	-46.3	18.1	-53.1	20.6	-60.4	23.3	-68.2	26.1	-76.5
	2	20	5.6	-17.2	6.3	-19.2	6.9	-21.3	7.7	-23.5	8.4	-25.7	9.2	-28.1	10.0	-30.6	11.7	-35.9	13.6	-41.7	15.6	-47.9	17.8	-54.5	20.1	-61.5	22.5	-68.9
	2	50	4.4	-14.7	5.0	-16.4	5.5	-18.2	6.1	-20.1	6.6	-22.0	7.3	-24.1	7.9	-26.2	9.3	-30.7	10.8	-35.7	12.4	-40.9	14.1	-46.6	15.9	-52.6	17.8	-58.9
	2	100	3.6	-12.9	4.0	-14.3	4.4	-15.9	4.8	-17.5	5.3	-19.2	5.8	-21.0	6.3	-22.8	7.4	-26.8	8.6	-31.1	9.9	-35.7	11.2	-40.6	12.7	-45.9	14.2	-51.4
	3	10	6.5	-20.6	7.3	-22.9	8.0	-25.4	8.9	-28.0	9.7	-30.8	10.6	-33.6	11.6	-36.6	13.6	-43.0	15.8	-49.8	18.1	-57.2	20.6	-65.1	23.3	-73.5	26.1	-82.4
	3	20	5.6	-18.5	6.3	-20.7	6.9	-22.9	7.7	-25.2	8.4	-27.7	9.2	-30.3	10.0	-33.0	11.7	-38.7	13.6	-44.9	15.6	-51.5	17.8	-58.6	20.1	-66.2	22.5	-74.2
	3	50	4.4	-15.8	5.0	-17.6	5.5	-19.5	6.1	-21.5	6.6	-23.6	7.3	-25.8	7.9	-28.1	9.3	-33.0	10.8	-38.3	12.4	-43.9	14.1	-50.0	15.9	-56.5	17.8	-63.3
	3	100	3.6	-13.8	4.0	-15.3	4.4	-17.0	4.8	-18.7	5.3	-20.6	5.8	-22.5	6.3	-24.5	7.4	-28.7	8.6	-33.3	9.9	-38.2	11.2	-43.5	12.7	-49.1	14.2	-55.1
Hip Roof > 20 to 27 degrees	1	10	6.5	-11.7	7.3	-13.0	8.0	-14.5	8.9	-15.9	9.7	-17.5	10.6	-19.1	11.6	-20.8	13.6	-24.4	15.8	-28.3	18.1	-32.5	20.6	-37.0	23.3	-41.8	26.1	-46.8
	1	20	5.6	-10.4	6.3	-11.6	6.9	-12.8	7.7	-14.1	8.4	-15.5	9.2	-16.9	10.0	-18.4	11.7	-21.6	13.6	-25.1	15.6	-28.8	17.8	-32.8	20.1	-37.0	22.5	-41.5
	1	50	4.4	-8.6	5.0	-9.6	5.5	-10.6	6.1	-11.7	6.6	-12.8	7.3	-14.0	7.9	-15.3	9.3	-17.9	10.8	-20.8	12.4	-23.9	14.1	-27.2	15.9	-30.7	17.8	-34.4
	1	100	3.6	-7.3	4.0	-8.1	4.4	-9.0	4.8	-9.9	5.3	-10.8	5.8	-11.9	6.3	-12.9	7.4	-15.1	8.6	-17.6	9.9	-20.2	11.2	-22.9	12.7	-25.9	14.2	-29.0
	2	10	6.5	-16.2	7.3	-18.0	8.0	-19.9	8.9	-22.0	9.7	-24.1	10.6	-26.4	11.6	-28.7	13.6	-33.7	15.8	-39.1	18.1	-44.9	20.6	-51.0	23.3	-57.6	26.1	-64.6
	2	20	5.6	-13.9	6.3	-15.5	6.9	-17.2	7.7	-18.9	8.4	-20.8	9.2	-22.7	10.0	-24.7	11.7	-29.0	13.6	-33.7	15.6	-38.7	17.8	-44.0	20.1	-49.7	22.5	-55.7
	2	50	4.4	-11.0	5.0	-12.2	5.5	-13.5	6.1	-14.9	6.6	-16.4	7.3	-17.9	7.9	-19.5	9.3	-22.9	10.8	-26.6	12.4	-30.5	14.1	-34.7	15.9	-39.2	17.8	-43.9
	2	100	3.6	-8.7	4.0	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2	-27.6	12.7	-31.2	14.2	-35.0
	3	10	6.5	-16.2	7.3	-18.0	8.0	-19.9	8.9	-22.0	9.7	-24.1	10.6	-26.4	11.6	-28.7	13.6	-33.7	15.8	-39.1	18.1	-44.9	20.6	-51.0	23.3	-57.6	26.1	-64.6
	3	20	5.6	-13.9	6.3	-15.5	6.9	-17.2	7.7	-18.9	8.4	-20.8	9.2	-22.7	10.0	-24.7	11.7	-29.0	13.6	-33.7	15.6	-38.7	17.8	-44.0	20.1	-49.7	22.5	-55.7
	3	50	4.4	-11.0	5.0	-12.2	5.5	-13.5	6.1	-14.9	6.6	-16.4	7.3	-17.9	7.9	-19.5	9.3	-22.9	10.8	-26.6	12.4	-30.5	14.1	-34.7	15.9	-39.2	17.8	-43.9
	3	100	3.6	-8.7	4.0	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2	-27.6	12.7	-31.2	14.2	-35.0
Hip Roof = 45 degrees	1	10	6.5	-12.4	7.3	-13.9	8.0	-15.4	8.9	-16.9	9.7	-18.6	10.6	-20.3	11.6	-22.1	13.6	-26.0	15.8	-30.1	18.1	-34.6	20.6	-39.3	23.3	-44.4	26.1	-49.8
	1	20	5.6	-10.7	6.3	-11.9	6.9	-13.2	7.7	-14.5	8.4	-15.9	9.2	-17.4	10.0	-19.0	11.7	-22.2	13.6	-25.8	15.6	-29.6	17.8	-33.7	20.1	-38.0	22.5	-42.7
	1	50	4.4	-8.3	5.0	-9.3	5.5	-10.3	6.1	-11.3	6.6	-12.4	7.3	-13.6	7.9	-14.8	9.3	-17.3	10.8	-20.1	12.4	-23.1	14.1	-26.2	15.9	-29.6	17.8	-33.2
	1	100	3.6	-6.5	4.0	-7.3	4.4	-8.0	4.8	-8.9	5.3	-9.7	5.8	-10.6	6.3	-11.6	7.4	-13.6	8.6	-15.8	9.9	-18.1	11.2	-20.6	12.7	-23.3	14.2	-26.1
	2	10	6.5	-14.7	7.3	-16.3	8.0	-18.1	8.9	-20.0	9.7	-21.9	10.6	-24.0	11.6	-26.1	13.6	-30.6	15.8	-35.5	18.1	-40.8	20.6	-46.4	23.3	-52.3	26.1	-58.7
	2	20	5.6	-12.4	6.3	-13.9	6.9	-15.4	7.7	-16.9	8.4	-18.6	9.2	-20.3	10.0	-22.1	11.7	-26.0	13.6	-30.1	15.6	-34.6	17.8	-39.3	20.1	-44.4	22.5	-49.8
	2	50	4.4	-9.5	5.0	-10.6	5.5	-11.7	6.1	-12.9	6.6	-14.2	7.3	-15.5	7.9	-16.9	9.3	-19.8	10.8	-23.0	12.4	-26.4	14.1	-30.0	15.9	-33.9	17.8	-38.0
	2	100	3.6	-7.3	4.0	-8.1	4.4	-9.0	4.8	-9.9	5.3	-10.8	5.8	-11.9	6.3	-12.9	7.4	-15.1	8.6	-17.6	9.9	-20.2	11.2	-22.9	12.7	-25.9	14.2	-29.0

	3	10	6.5	-19.1	7.3	-21.3	8.0	-23.6	8.9	-26.0	9.7	-28.6	10.6	-31.2	11.6	-34.0	13.6	-39.9	15.8	-46.3	18.1	-53.1	20.6	-60.4	23.3	-68.2	26.1	-76.5
	3	20	5.6	-16.0	6.3	-17.8	6.9	-19.7	7.7	-21.8	8.4	-23.9	9.2	-26.1	10.0	-28.4	11.7	-33.4	13.6	-38.7	15.6	-44.4	17.8	-50.5	20.1	-57.1	22.5	-64.0
	3	50	4.4	-11.9	5.0	-13.2	5.5	-14.6	6.1	-16.1	6.6	-17.7	7.3	-19.4	7.9	-21.1	9.3	-24.8	10.8	-28.7	12.4	-33.0	14.1	-37.5	15.9	-42.3	17.8	-47.5
	3	100	3.6	-8.7	4.0	-9.7	4.4	-10.8	4.8	-11.9	5.3	-13.1	5.8	-14.3	6.3	-15.5	7.4	-18.2	8.6	-21.2	9.9	-24.3	11.2	-27.6	12.7	-31.2	14.2	-35.0
Walls	4	10	8.7	-9.5	9.7	-10.6	10.8	-11.7	11.9	-12.9	13.1	-14.2	14.3	-15.5	15.5	-16.9	18.2	-19.8	21.2	-22.9	24.3	-26.3	27.6	-30.0	31.2	-33.8	35.0	-37.9
	4	20	8.3	-9.1	9.3	-10.1	10.3	-11.2	11.4	-12.4	12.5	-13.6	13.6	-14.8	14.8	-16.2	17.4	-19.0	20.2	-22.0	23.2	-25.2	26.4	-28.7	29.8	-32.4	33.4	-36.4
	4	50	7.8	-8.6	8.7	-9.5	9.7	-10.6	10.7	-11.7	11.7	-12.8	12.8	-14.0	13.9	-15.2	16.3	-17.9	18.9	-20.7	21.7	-23.8	24.7	-27.1	27.9	-30.6	31.3	-34.3
	4	100	7.4	-8.2	8.3	-9.1	9.2	-10.1	10.1	-11.1	11.1	-12.2	12.1	-13.3	13.2	-14.5	15.5	-17.1	18.0	-19.8	20.7	-22.7	23.5	-25.8	26.5	-29.2	29.7	-32.7
	5	10	8.7	-11.7	9.7	-13.0	10.8	-14.5	11.9	-15.9	13.1	-17.5	14.3	-19.1	15.5	-20.8	18.2	-24.4	21.2	-28.3	24.3	-32.5	27.6	-37.0	31.2	-41.8	35.0	-46.8
	5	20	8.3	-10.9	9.3	-12.2	10.3	-13.5	11.4	-14.9	12.5	-16.3	13.6	-17.8	14.8	-19.4	17.4	-22.8	20.2	-26.4	23.2	-30.3	26.4	-34.5	29.8	-39.0	33.4	-43.7
	5	50	7.8	-9.9	8.7	-11.0	9.7	-12.2	10.7	-13.4	11.7	-14.8	12.8	-16.1	13.9	-17.6	16.3	-20.6	18.9	-23.9	21.7	-27.4	24.7	-31.2	27.9	-35.2	31.3	-39.5
	5	100	7.4	-9.1	8.3	-10.1	9.2	-11.2	10.1	-12.4	11.1	-13.6	12.1	-14.8	13.2	-16.2	15.5	-19.0	18.0	-22.0	20.7	-25.2	23.5	-28.7	26.5	-32.4	29.7	-36.4

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m2, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. The effective wind area shall be equal to the span length multiplied by an effective width. This width shall be not less than one-third the span length. For cladding fasteners, the effective wind areas shall not be greater than the area that is tributary to an individual fastener.

b. For effective areas between those given, the load shall be interpolated or the load associated with the lower effective areas shall be used.

c. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table R301.2.1(2).

d. See Figure R301.2.1 for locations of zones.

e. Plus and minus signs signify pressures acting toward and away from the building surfaces.

f. Positive and negative design wind pressures shall not be less than 10 psf.

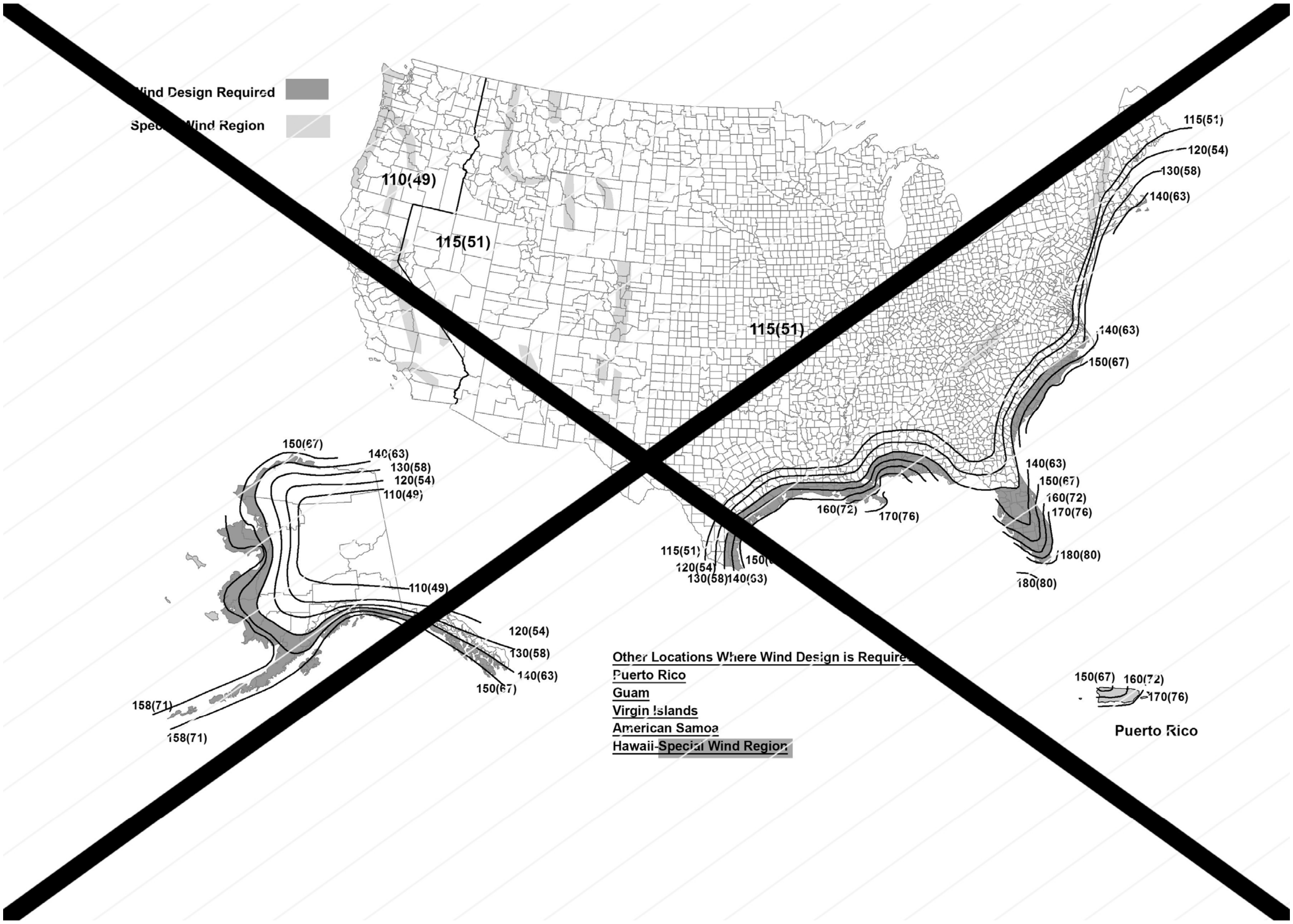
g. Roof overhang loads shall be determined by summing the aplicable roof zone pressure with the adjacent wall zone pressure.

Revise as follows:

TABLE R301.2.1(2) HEIGHT AND EXPOSURE ADJUSTMENT COEFFICIENTS FOR Table R301.2.1(1)

MEAN ROOF HEIGHT	EXPOSURE		
	B	C	D
15	0.82	1.21	1.47
20	0.89	1.29	1.55
25	0.94	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	~~1.09~~ 1.06	1.49	1.74
45	~~1.12~~ 1.10	1.53	1.78
50	~~1.16~~ 1.13	1.56	1.81
55	~~1.19~~ 1.16	1.59	1.84
60	~~1.22~~ 1.19	1.62	1.87

Delete and substitute as follows:



~~FIGURE R301.2.1.1 REGIONS WHERE WIND DESIGN IS REQUIRED~~

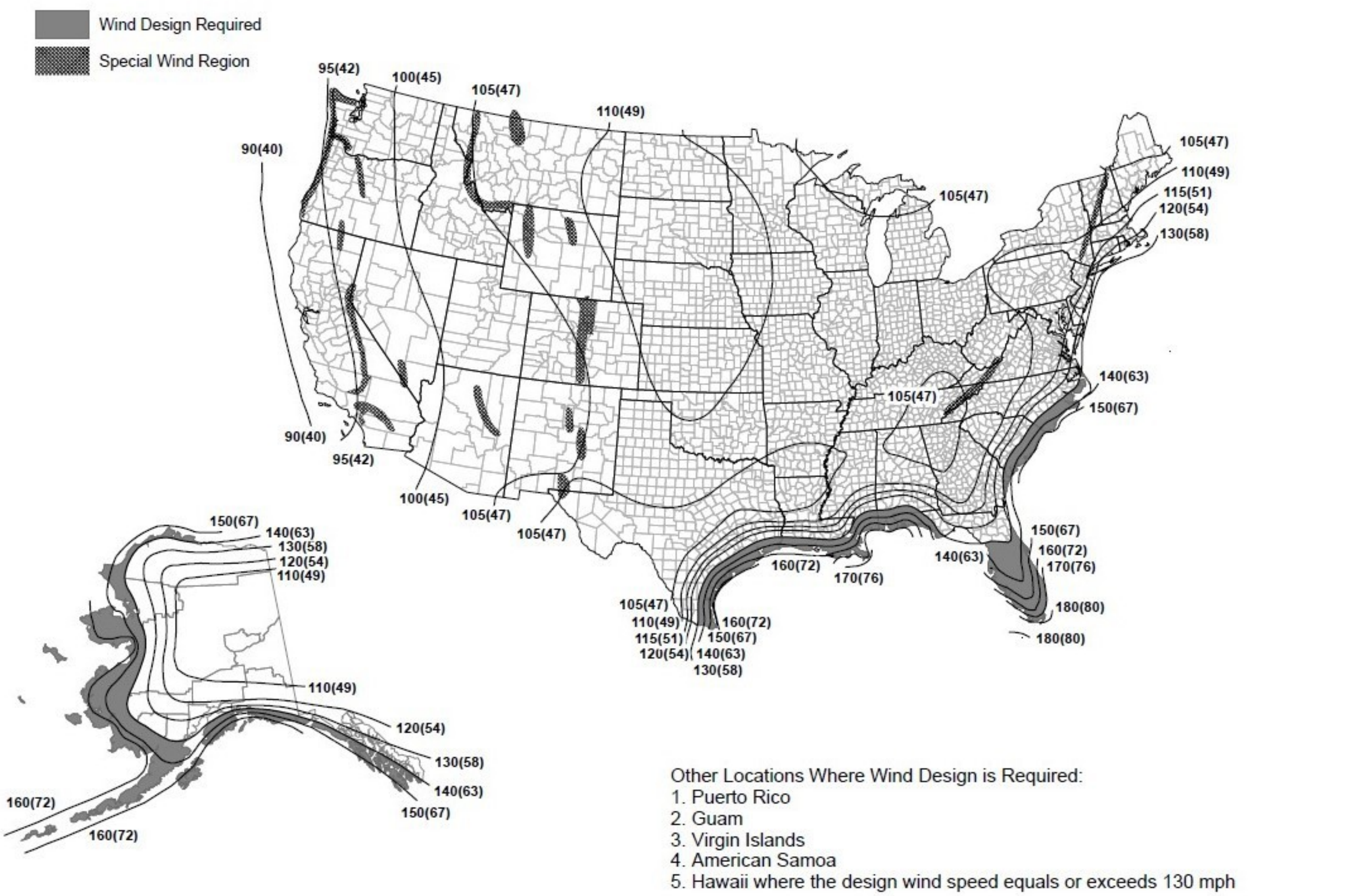
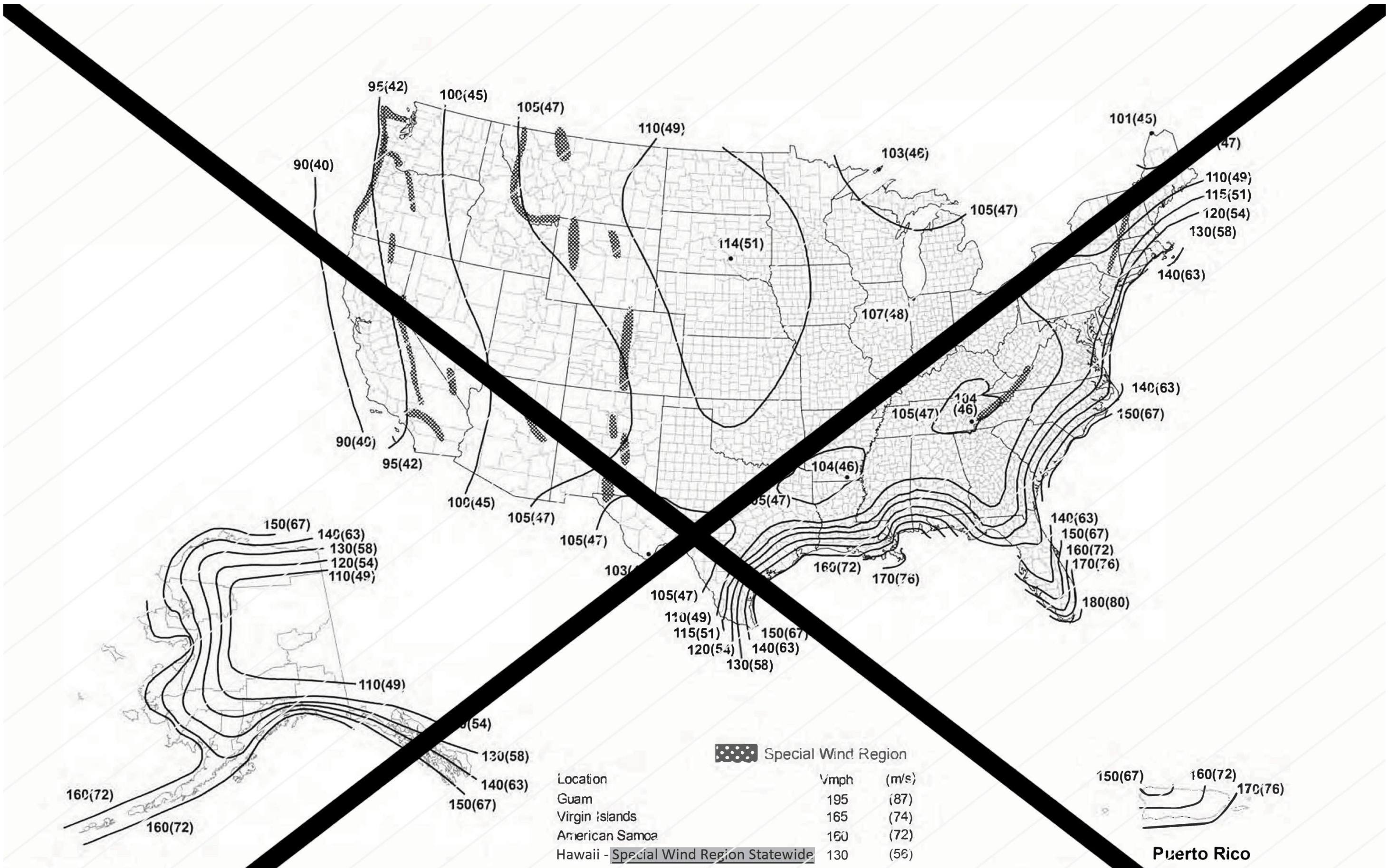
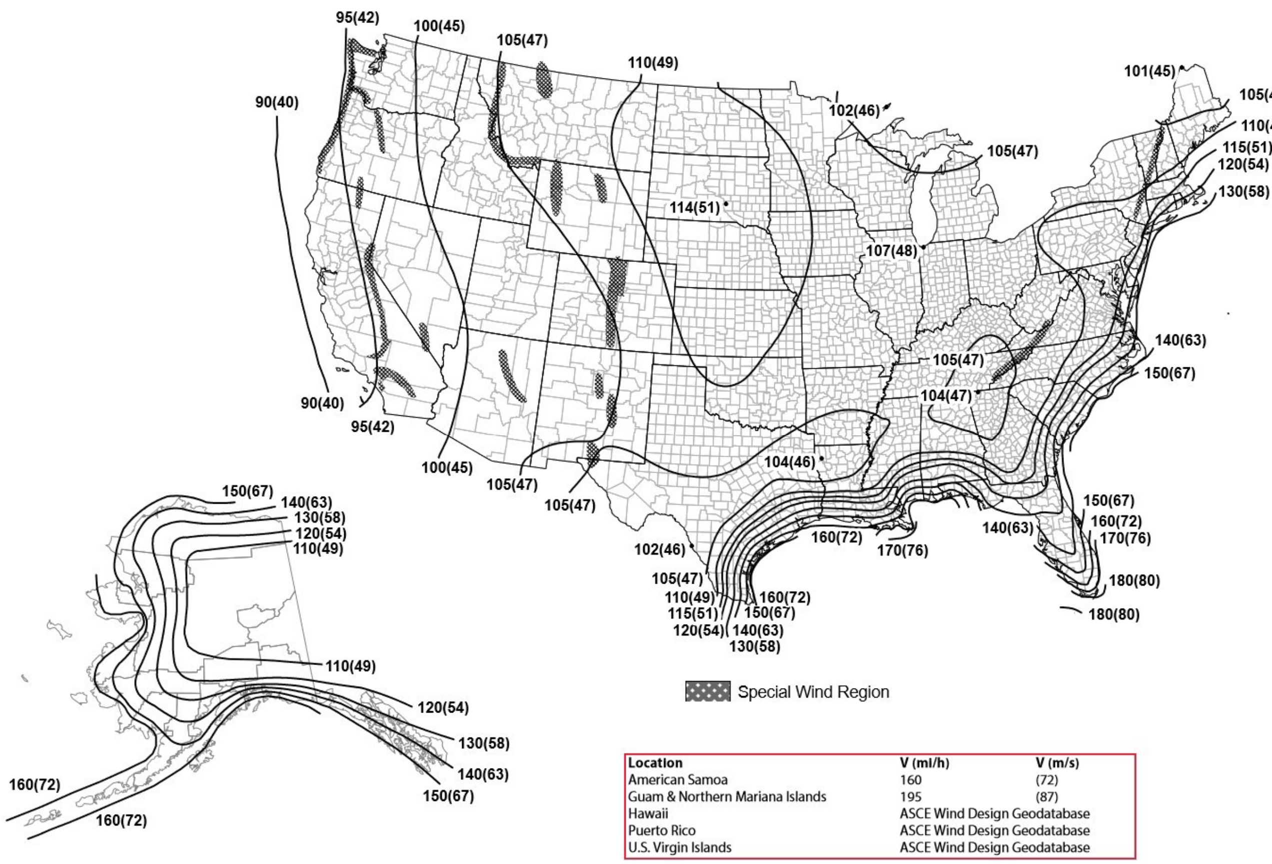


FIGURE R301.2.1.1 REGIONS WHERE WIND DESIGN IS REQUIRED



Notes:
1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
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. 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

~~FIGURE R301.2(2) ULTIMATE DESIGN WIND SPEEDS~~



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 3-second gust wind speeds in miles per hour (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 7% 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 R301.2(2) ULTIMATE DESIGN WIND SPEEDS

Revise as follows:

R301.2.1.5 Topographic wind effects. In areas designated in Table R301.2 as having local historical data documenting structural damage

to buildings caused by wind speed-up at isolated *hills*, ridges and escarpments that are abrupt changes from the general topography of the area, topographic wind effects shall be considered in the design of the building in accordance with Section R301.2.1.5.1 or in accordance with the provisions of ASCE 7. See Figure R301.2.1.5.1(1) for topographic features for wind speed-up effect.
In these designated areas, topographic wind effects shall apply only to buildings sited on the top half of an isolated *hill*, *ridge* or escarpment where all of the following conditions exist:

1. The average slope of the top half of the *hill*, *ridge* or escarpment is 10 percent or greater.
2. The *hill*, *ridge* or escarpment is 60 feet (18 288 mm) or greater in height for Exposure B, 30 feet (9144 mm) or greater in height for Exposure C, and 15 feet (4572 mm) or greater in height for Exposure D.
3. ~~The *hill*, *ridge* or escarpment is isolated or unobstructed by other topographic features of similar height in the upwind direction for a distance measured from its high point of 100 times its height or 2 miles (3.2 km), whichever is less. See Figure R301.2.1.5.1(3) for upwind obstruction.~~
4. ~~The *hill*, *ridge* or escarpment protrudes by a factor of two or more above the height of other upwind topographic features located in any quadrant within a radius of 2 miles (3.2 km) measured from its high point.~~

ASCE/SEI

American Society of Civil Engineers
Structural Engineering Institute
Reston, VA 20191-4400

7~~–16 with Supplement 1~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IRC 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 Figure R301.2(2) 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 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.

Figure R301.2(2) Ultimate design wind speed: This section updates the basic wind speed map for the 700 MRI map (Risk Category II) for the contiguous United States and Alaska, as well as the Notes, to match what is in ASCE/SEI 7-22. 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.

Figure R301.2.1 Component and Cladding Pressure Zones.

The zones for roof design have been simplified, see the changes in the Plan View diagrams. The corresponding simplification is updated in **Table R301.2.1(1)**.

Table R301.2.1(2) Height and Exposure Adjustment Coefficients.

Vales for exposure B at 40 feet and above have been slightly reduced.

Figure R301.2.1.1 Regions where wind design is required.

This figure has been updated with the new base map from 7-22.

Section R302.2.1.5 Topographic wind effects.

The designated conditions identified in 3., and in 4., were removed from the requirements in ASCE 7-22.

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.

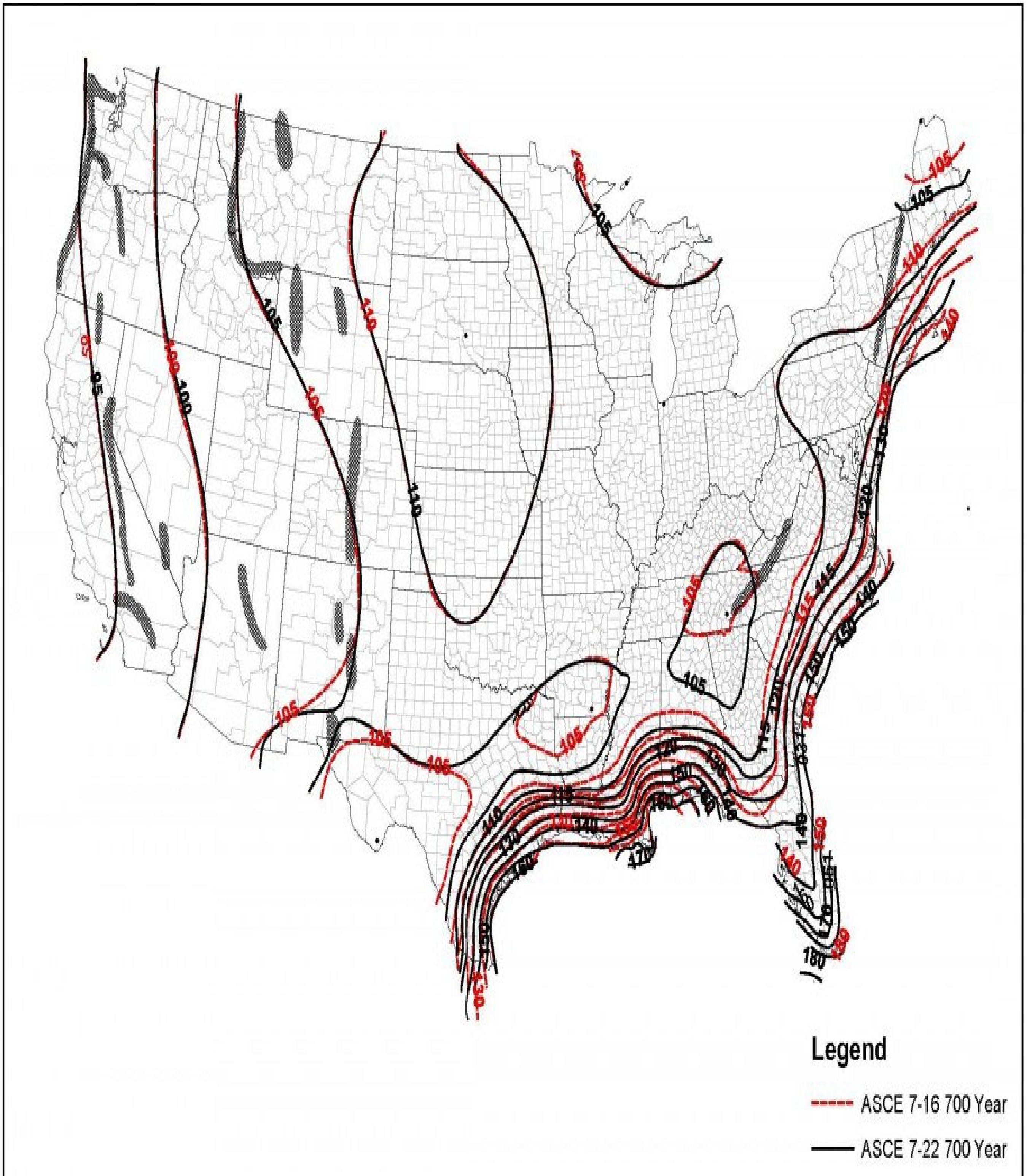


FIGURE: Comparison of ASCE/SEI 7-22 basic wind speeds for Risk Category II (700 Year MRI) to ASCE/SEI 7-16. (Courtesy ARA)

All of the other proposed changes are editorial and will not impact the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved for correlation of the wind speeds with ASCE7-22. Staying current with the most recent data and information is important. (Vote: 10-0)

Final Hearing Results

RB35-22	AS

RB37-22

Original Proposal

IRC: R301.2.2

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)

2021 International Residential Code

Revise as follows:

R301.2.2 Seismic provisions. Buildings within the scope of this code as defined in Section R101.2~~in *Seismic Design Categories* C, D_0, D_1 and D_2~~ shall be constructed in accordance with the requirements of this section and other seismic requirements of this code. The seismic provisions of this code shall apply as follows:

1. *Townhouses* and buildings as permitted by the exceptions to Section R101.2 containing three or more dwelling unitsin *Seismic Design Categories* C, D_0, D_1 and D_2.
2. Detached one- and two-family *dwellings* and buildings as permitted by the exceptions to Section R101.2 containing less than three dwelling units in *Seismic Design Categories*, D_0, D_1 and D_2.

Buildings in Seismic Design Category E shall be designed to resist seismic loads in accordance with the*International Building Code* , except where the *Seismic Design Category* ~~seismic design category~~ is reclassified to a lower*Seismic Design Category* ~~seismic design category~~ in accordance with Section R301.2.2.1. Components of buildings not required to be designed to resist seismic loads shall be constructed in accordance with the provisions of this code.

Reason: This proposal clarifies when seismic design provisions are required for buildings that are not clearly identifiable as a traditional townhouse or one- or two-family designation. Three dwelling units was selected as the threshold based on the current definition of townhouse which is “A building that contains three or more attached townhouse units.”
The IRC seismic provisions have always been required for all buildings within the scope of this code, based upon the Seismic Design Category and use. In Seismic Design Category C, certain seismic provisions are only required for townhouses or similar structures and do not apply to one- and two-family dwellings. However, under Section R101.2, building uses that fall within the scope of the IRC are not always clearly identifiable as one of these traditional designations: townhouses or one- or two-family dwellings. Specifically, Section R101.2 exception 2, identifies “lodging houses” as within the IRC scope but there is no guidance that specifies if this should comply with requirements for townhouse or one- or two-family dwellings, where they diverge. The current language leaves the application of seismic provisions for non-traditional designations (other than townhouses or one- or two-family dwellings) open to interpretation by the code official when the project is located in Seismic Design Category C. The proposed language clearly states when seismic provisions are required for these buildings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal revises the language used to determine when seismic design provisions are required, to accommodate the intended scope of the IRC which includes non-traditional uses that cannot be clearly classified as either a townhouse or one- or two-family dwelling. There is no change to the technical content of the provisions or the intended scope of seismic provisions. Seismic provisions have always been determined based on the Seismic Design Category and number of dwelling units, so there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved since this clarifies that all types of facilities constructed under the IRC (Section 101.2 townhouses and exceptions) have to comply with the applicable seismic criteria. (Vote: 10-0)

Final Hearing Results

RB37-22	AS

RB38-22

Original Proposal

IRC: R301.2.2.1, R301.2.2.1.2, R301.2.2.1.1, FIGURE R301.2.2.1(1), FIGURE R301.2.2.1(2), FIGURE R301.2.2.1(3), FIGURE R301.2.2.1(4), FIGURE R301.2.2.1(5), FIGURE R301.2.2.1(6), FIGURE R301.2.2.1(7) (New)

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, Washington State University, Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); Sanaz Rezaeian, USGS (srezaeian@usgs.gov); Nicolas Luco, U.S. Geological Survey

2021 International Residential Code

Revise as follows:

R301.2.2.1 Determination of seismic design category. Buildings shall be assigned a seismic design category in accordance with Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7).

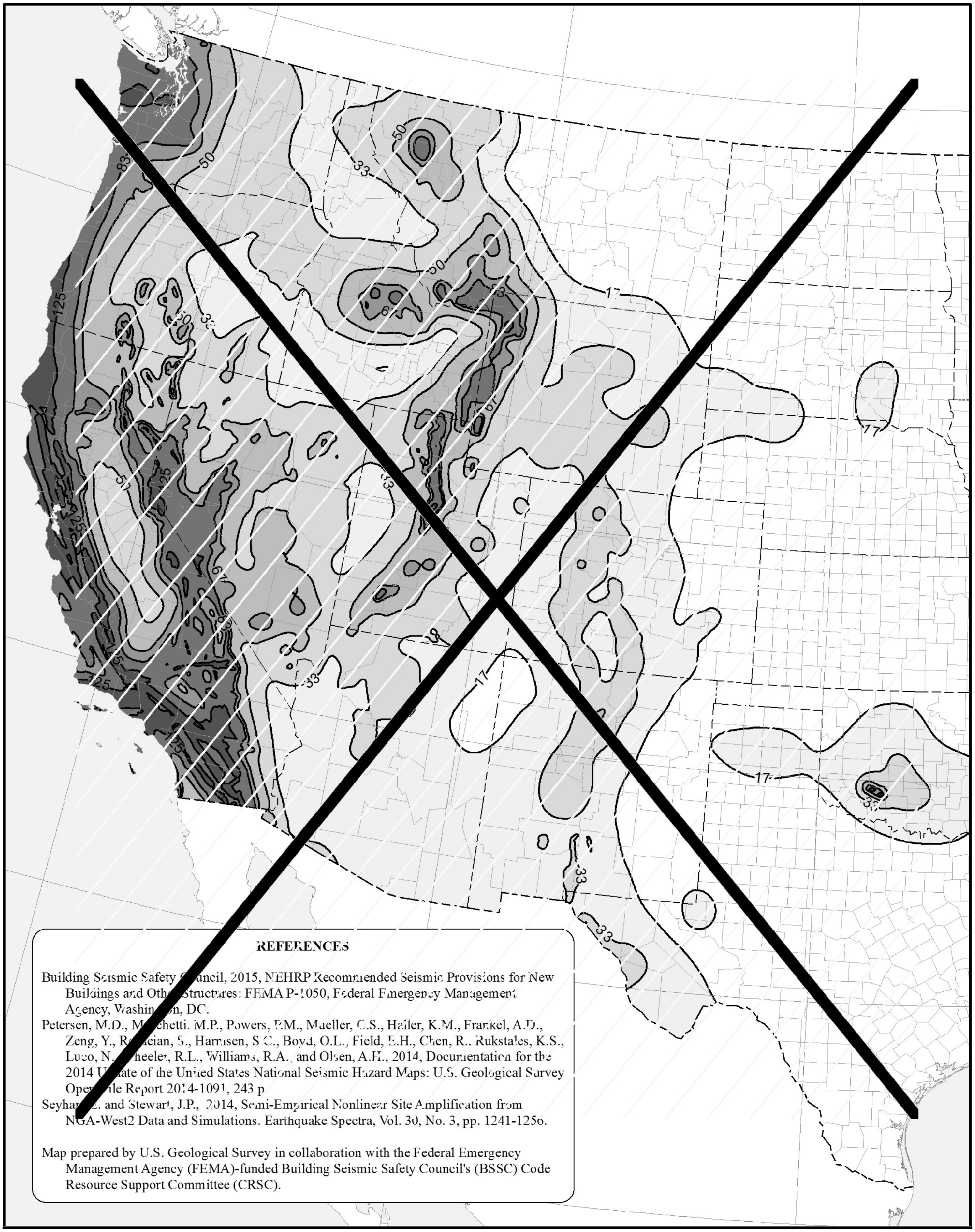
R301.2.2.1.2 Alternative determination of Seismic Design Category E. Buildings located in Seismic Design Category E in accordance with Figures R301.2.2.1(1) through R301.2.2.1(7) ~~R301.2.2.1(6), or Figures R301.2.2.1.1(1)through R301.2.2.1.1(6) where applicable~~, are permitted to be reclassified as being in Seismic Design Category D_2 provided that one of the following is done:

1. A more detailed evaluation of the seismic design category is made in accordance with the provisions and maps of the *International Building Code* . Buildings located in Seismic Design Category E in accordance with Table R301.2.2.1.1, but located in Seismic Design Category D in accordance with the *International Building Code* , shall be permitted to be designed using the Seismic Design Category D_2 requirements of this code.
2. Buildings located in Seismic Design Category E that conform to all of the following additional restrictions are permitted to be constructed in accordance with the provisions for Seismic Design Category D_2 of this code:
   2.1. All exterior shear wall lines or *braced wall panels* are in one plane vertically from the foundation to the uppermost *story*.

   2.2. Floors shall not cantilever past the *exterior walls*.

   2.3. The building is within the requirements of Section R301.2.2.6 for being considered as regular.

R301.2.2.1.1 Alternate determination of ~~seismic design category~~ Seismic Design Category. ~~If soil conditions are determined by the building official to be Site Class A, B, or D, the~~ The *Seismic Design Category* ~~seismic design category~~ and short-period design spectral response accelerations, S_{DS}, for a site shall be allowed to be determined in accordance with ~~Figures R301.2.2.1.1(1) through R301.2.2.1.1(6), or~~ Section 1613 ~~1613.2~~ of the International Building Code. The value of S_{DS} determined in accordance with ~~Section 1613.2 of~~ the International Building Code is permitted to be used to set the *Seismic Design Category* ~~seismic design category~~ in accordance with Table R301.2.2.1.1, and to interpolate between values in Tables R602.10.3(3) and R603.9.2(1) and other seismic design requirements of this code.



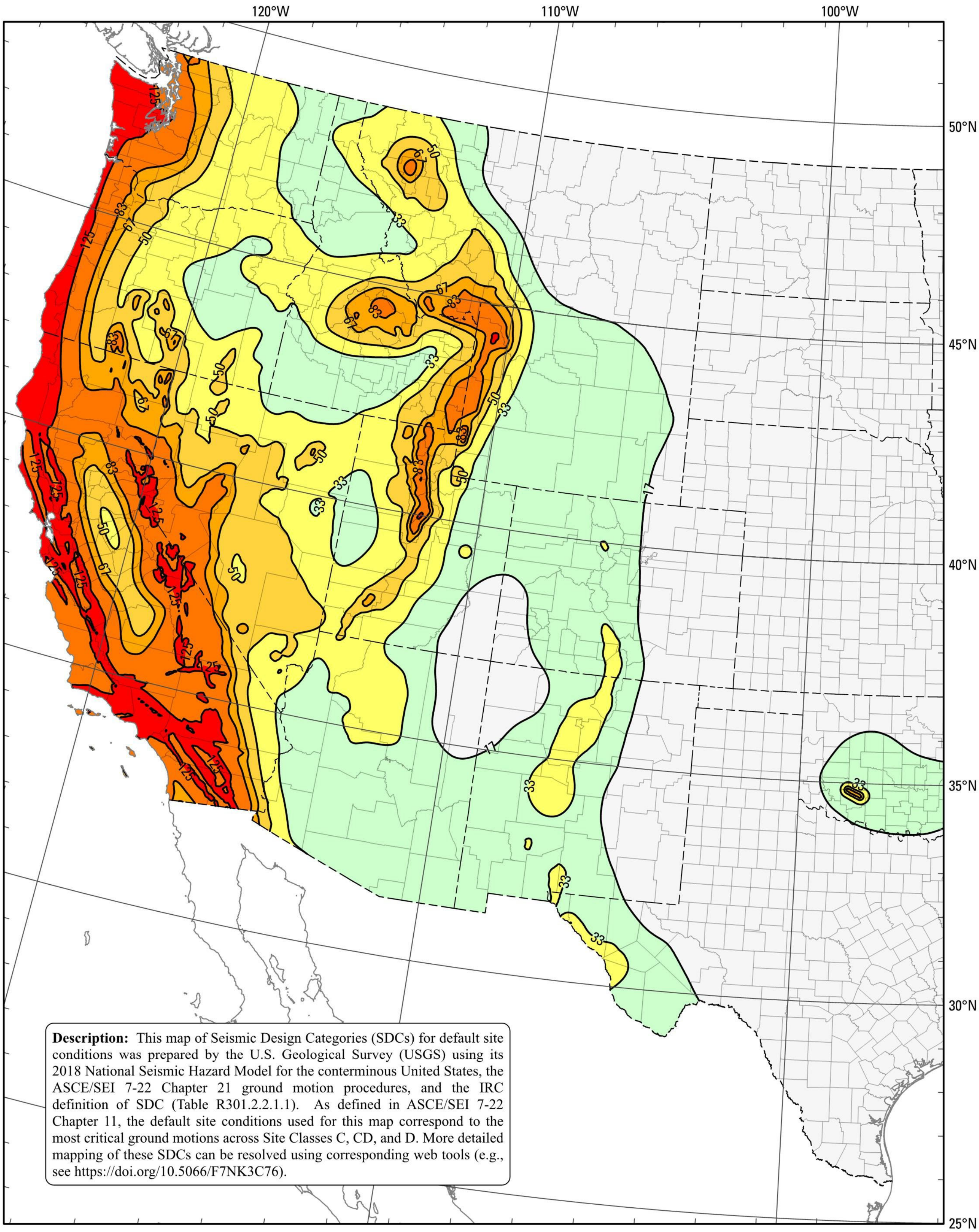
REFERENCES

Building Seismic Safety Council, 2015, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-1050, Federal Emergency Management Agency, Washington, DC.

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, 243 p.

Seyhan, E. and Stewart, J.P., 2014, Semi-Empirical Nonlinear Site Amplification from NGA-West2 Data and Simulations. Earthquake Spectra, Vol. 30, No. 3, pp. 1241-1256.

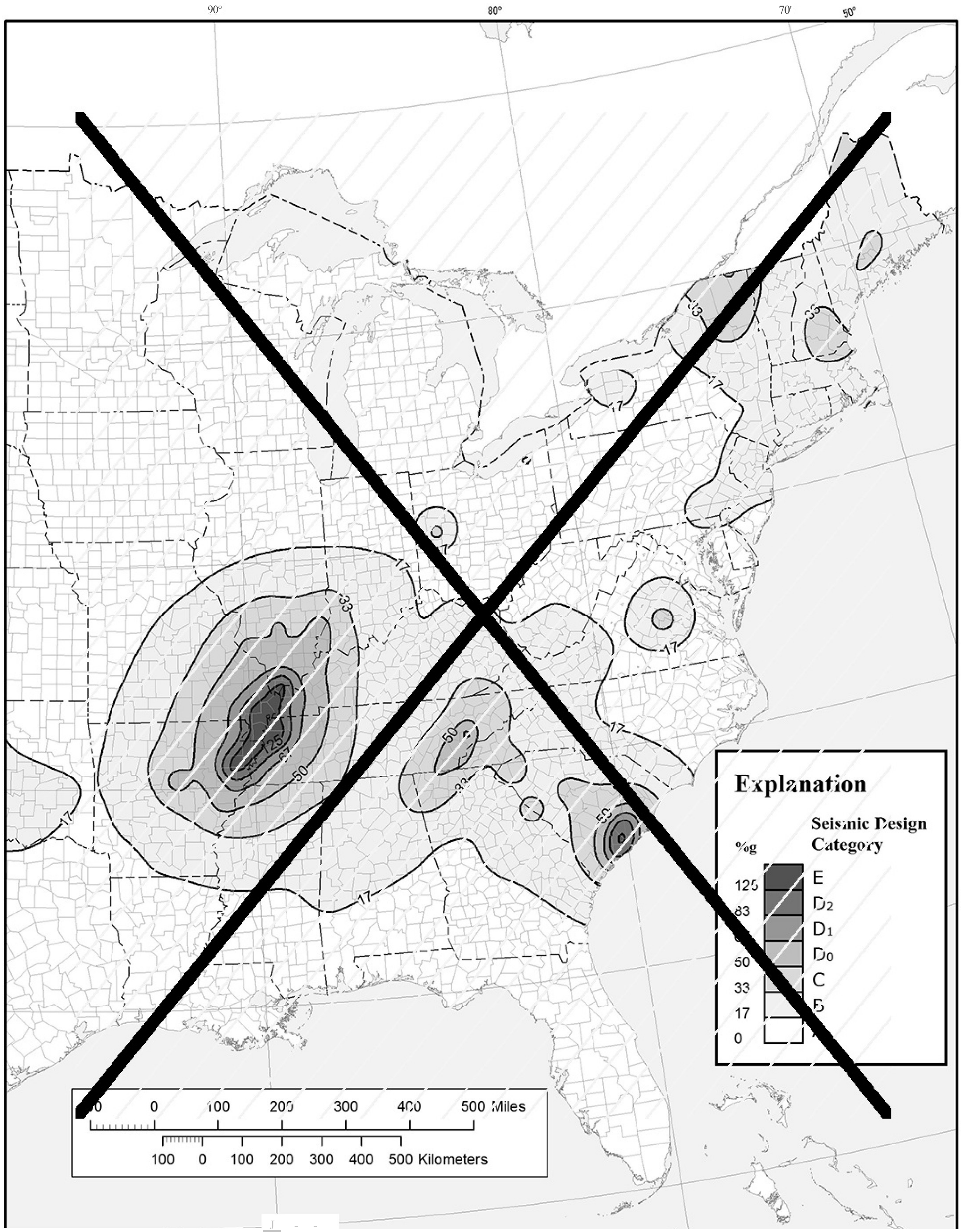
Map prepared by U.S. Geological Survey in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council's (BSSC) Code Resource Support Committee (CRSC).



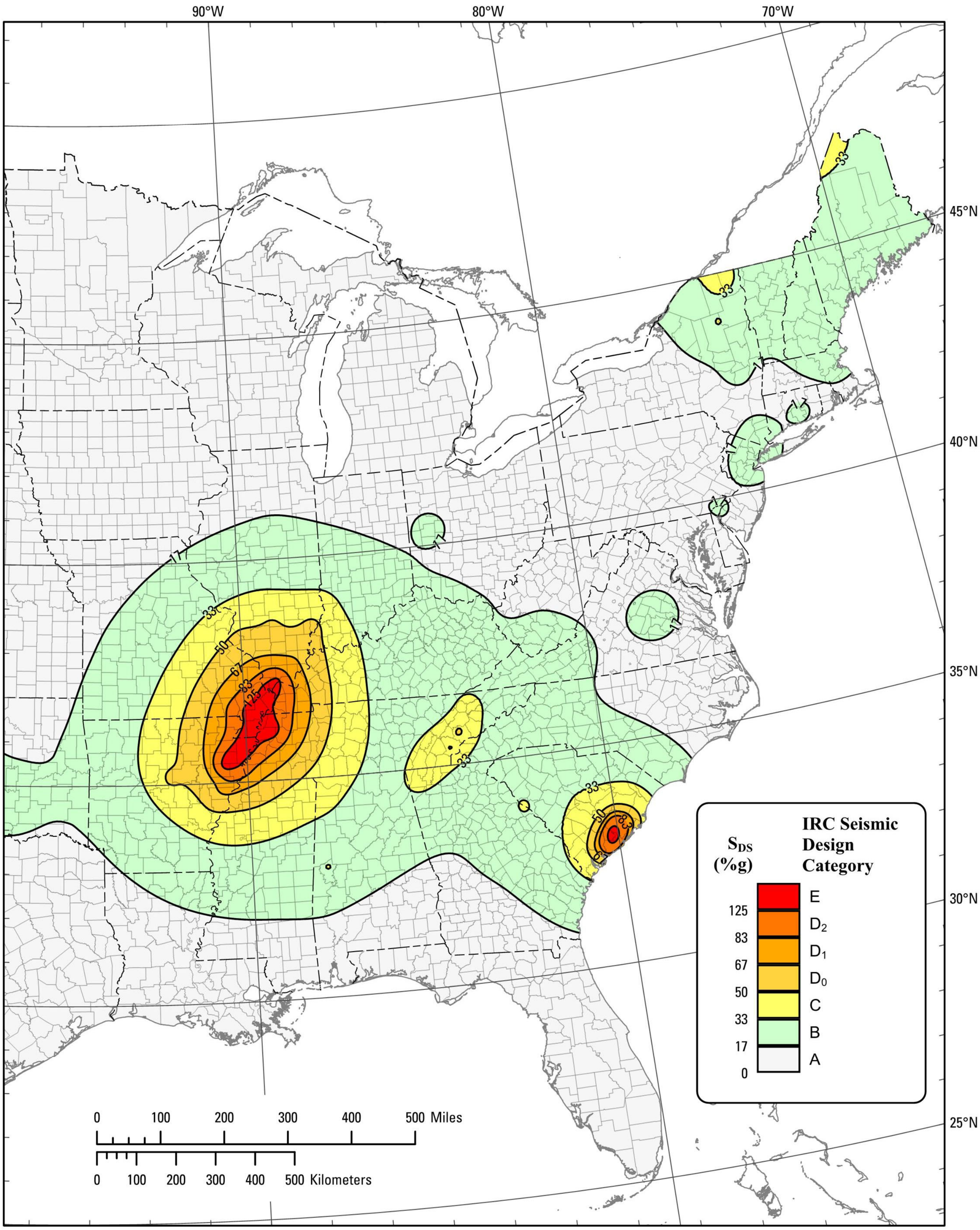
a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7.

~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(5)~~ R301.2.2.1(1) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR THE CONTERMINOUS UNITED STATES[a]



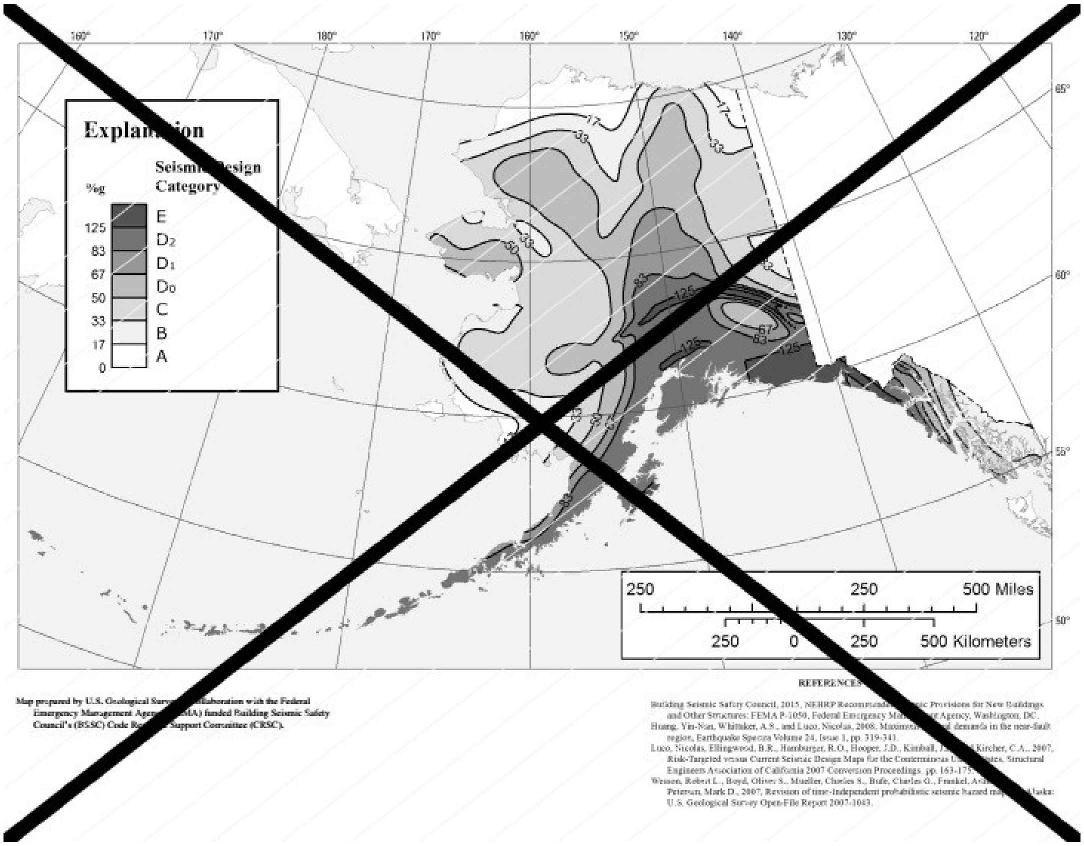
90°
80°
70°
45°
40°
35°
30°
25°
Explanation
Seismic Design Category
%g
125
83
50
33
17
0
E
D2
D1
D0
C
0
100
200
300
400
500 Miles
100
0
100
200
300
400
500 Kilometers

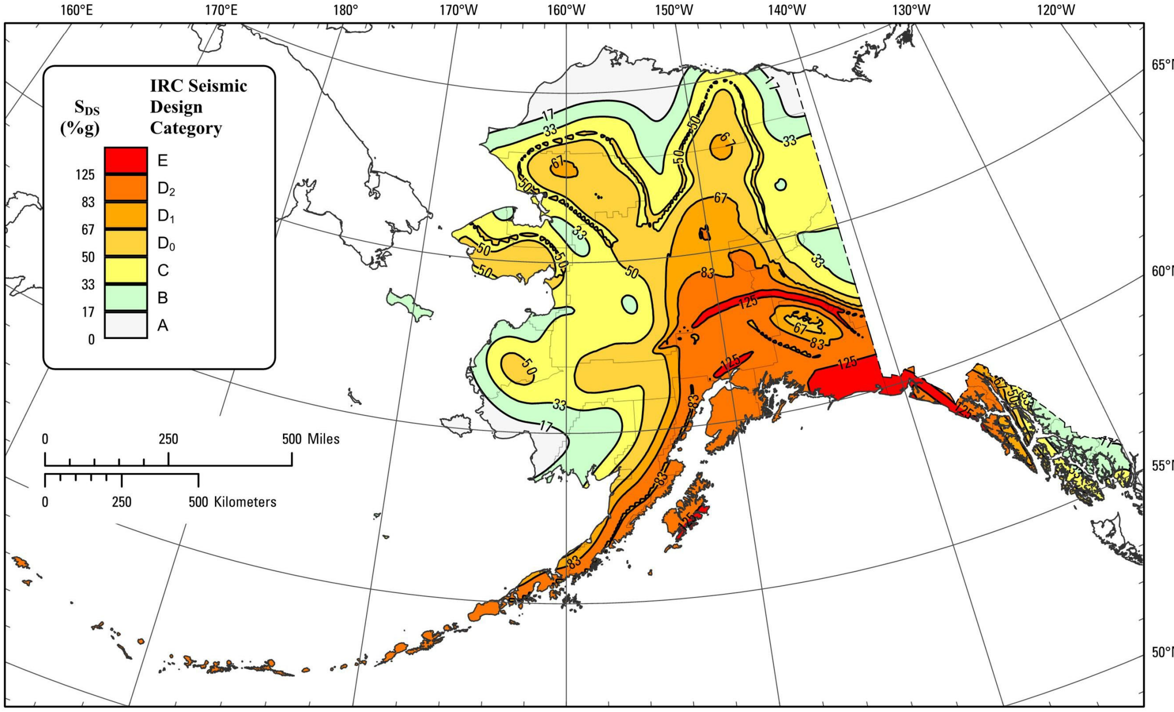


a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7), are based on the default Site Class as defined in Chapter 11 of ASCE 7.

~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(6)~~ R301.2.2.1(2) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR THE CONTERMINOUS UNITED STATES - CONTINUED[a]

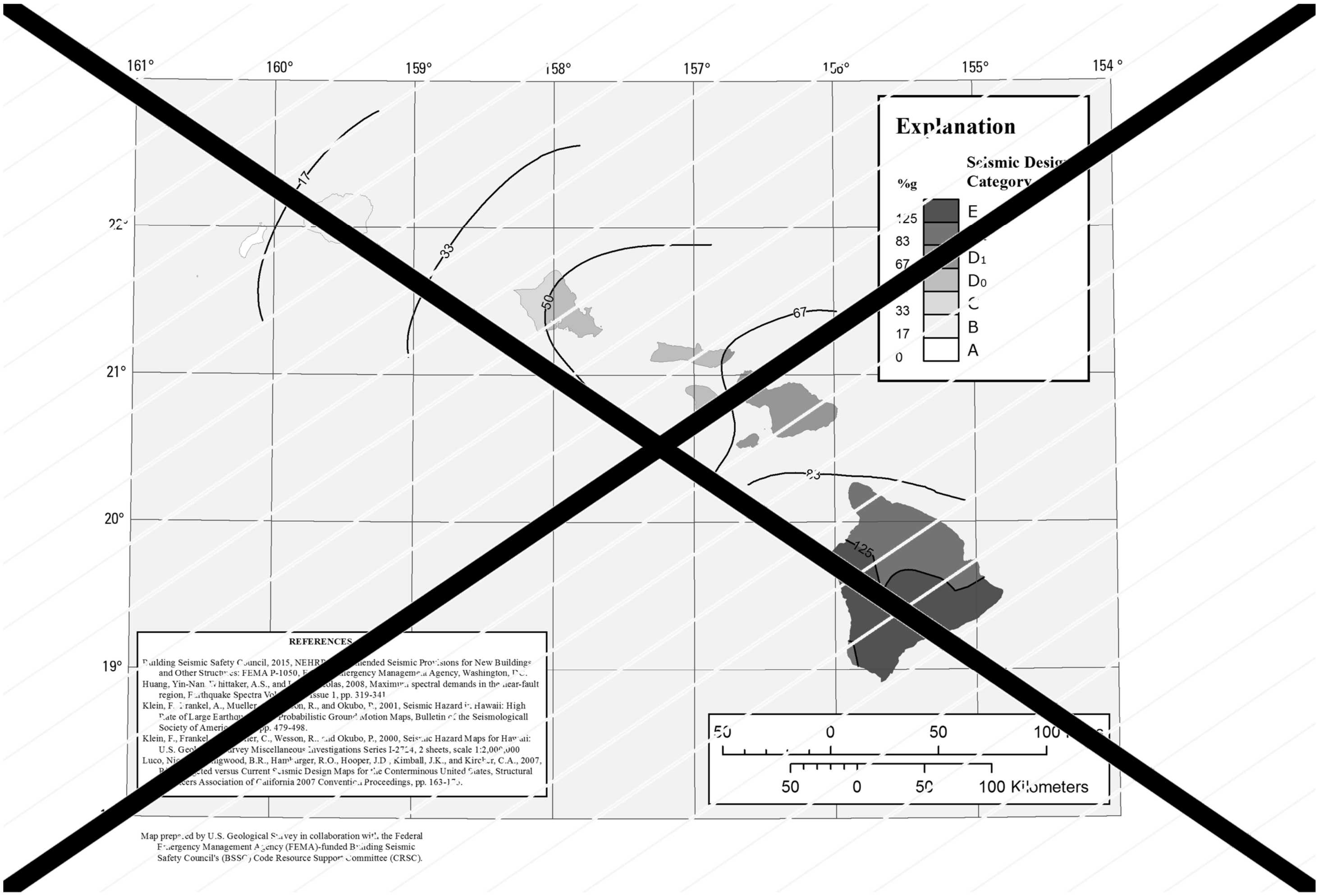


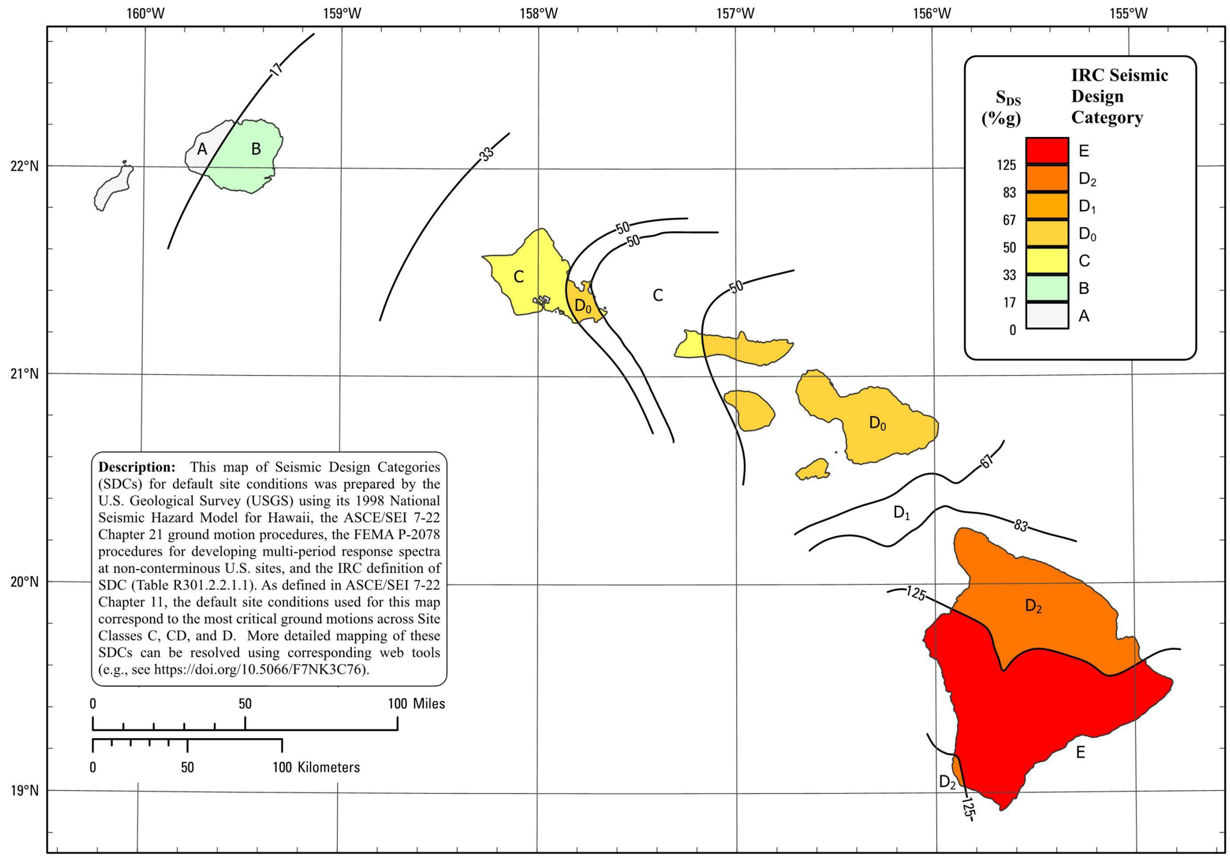


Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2007 National Seismic Hazard Model for Alaska, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, 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 (e.g., see https://doi.org/10.5066/F7NK3C76).

a. The Seismic Design Categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on 7 the default Site Class as defined in Chapter 11 of ASCE. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

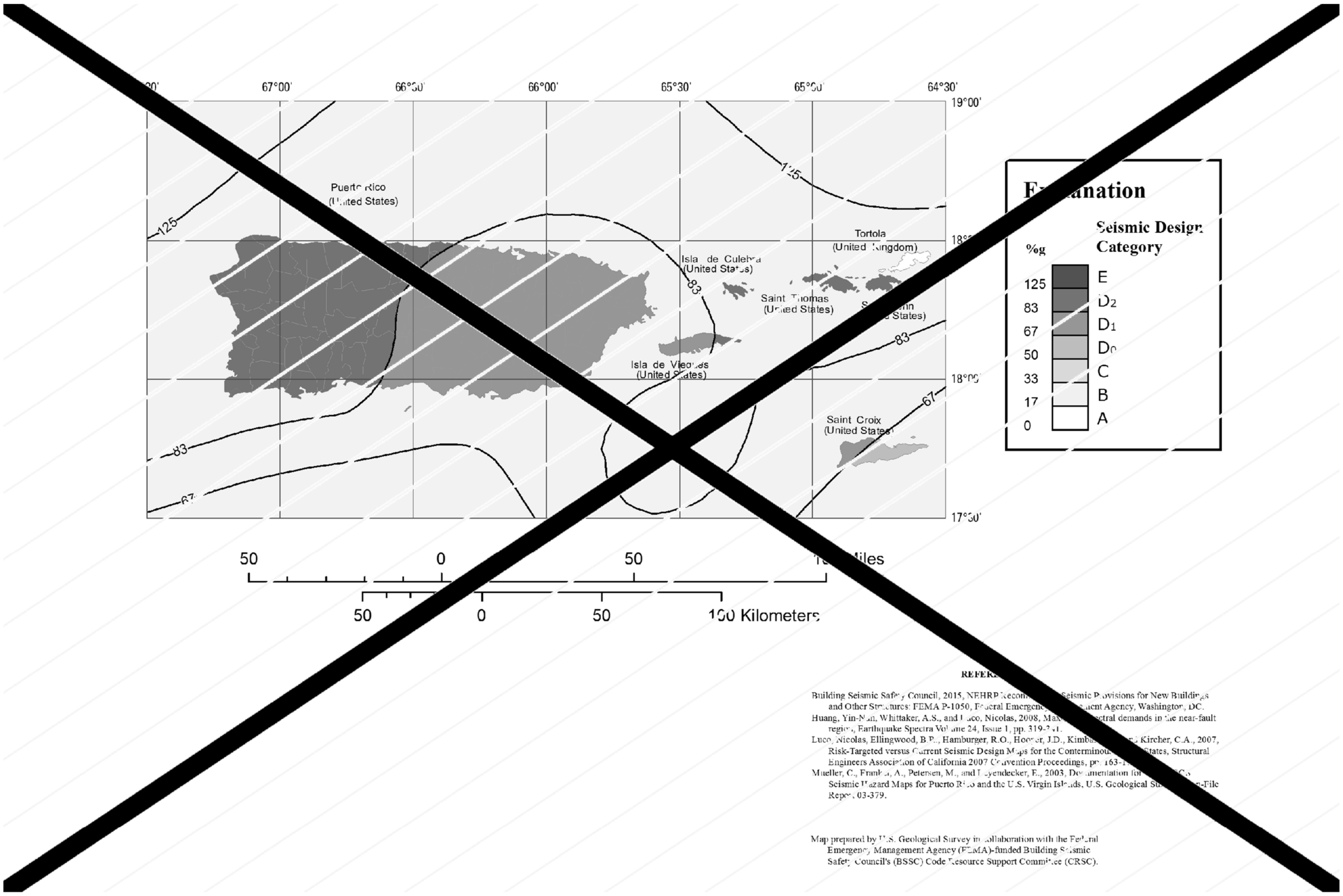
FIGURE ~~R301.2.2.1(1)~~ R301.2.2.1(3) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR ALASKA[a]

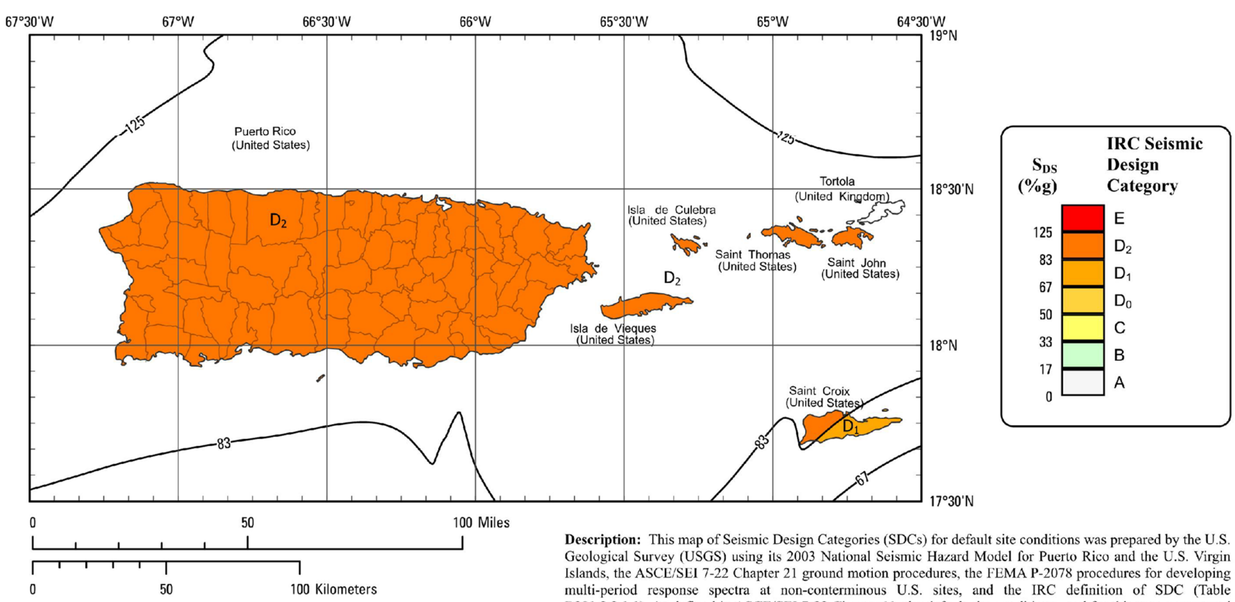

161°
160°
159°
158°
157°
155°
154°
22°
21°
20°
19°
17
33
50
67
83
125
Explanation
Seismic Design Category
%g
125
83
67
33
17
0
E
D1
D0
B
A
REFERENCES
50
0
50
100
Kilometers
Map prepared by U.S. Geological Survey in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council's (BSSC) Code Resource Support Committee (CRSC).



a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on the default Site Class as defined in Chapter 11 of ASCE 7. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(2)~~ R301.2.2.1(4) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR HAWAII[a]





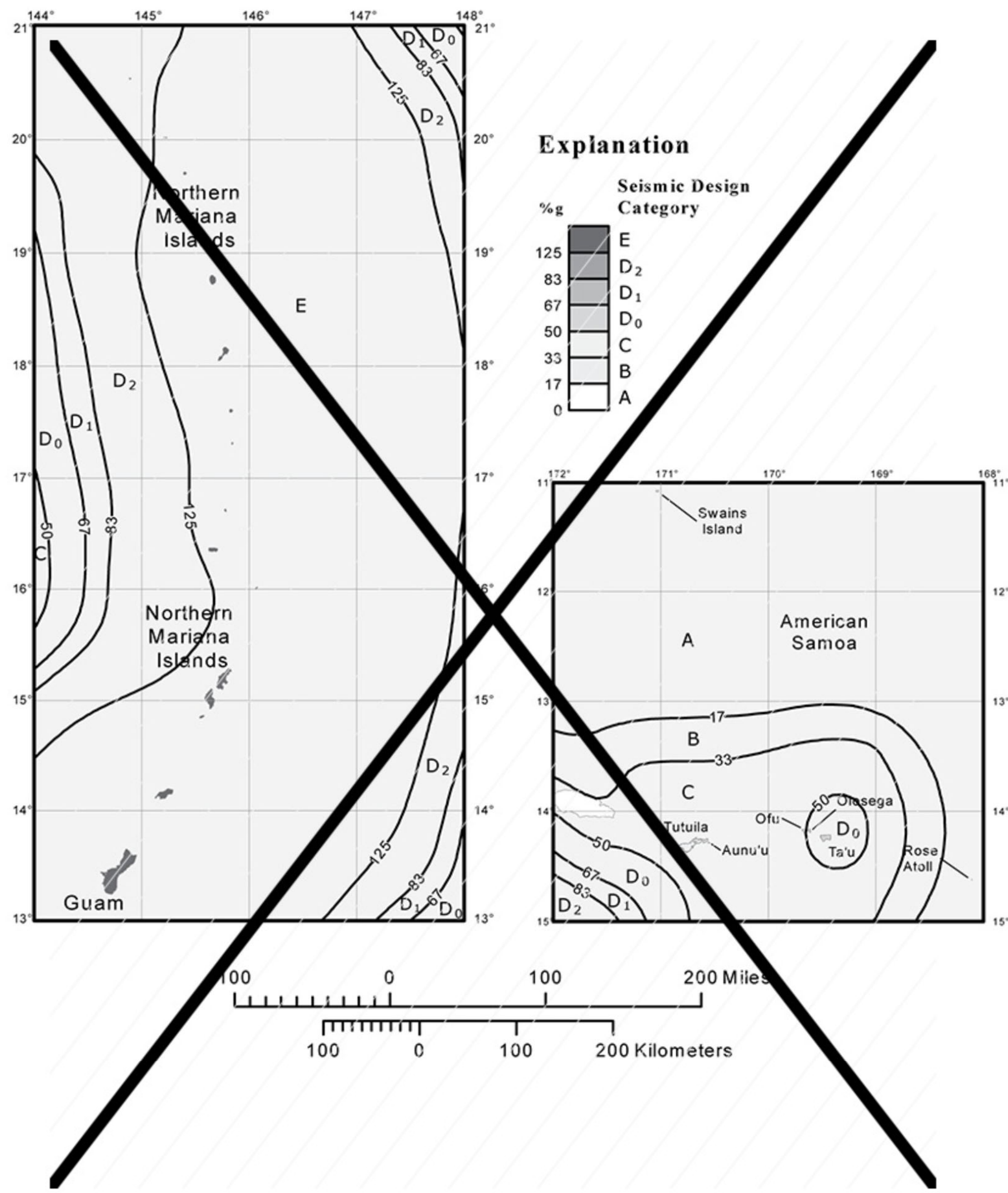
Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the U.S. Virgin Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, 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 (e.g., see https://doi.org/10.5066/F7NK3C76).

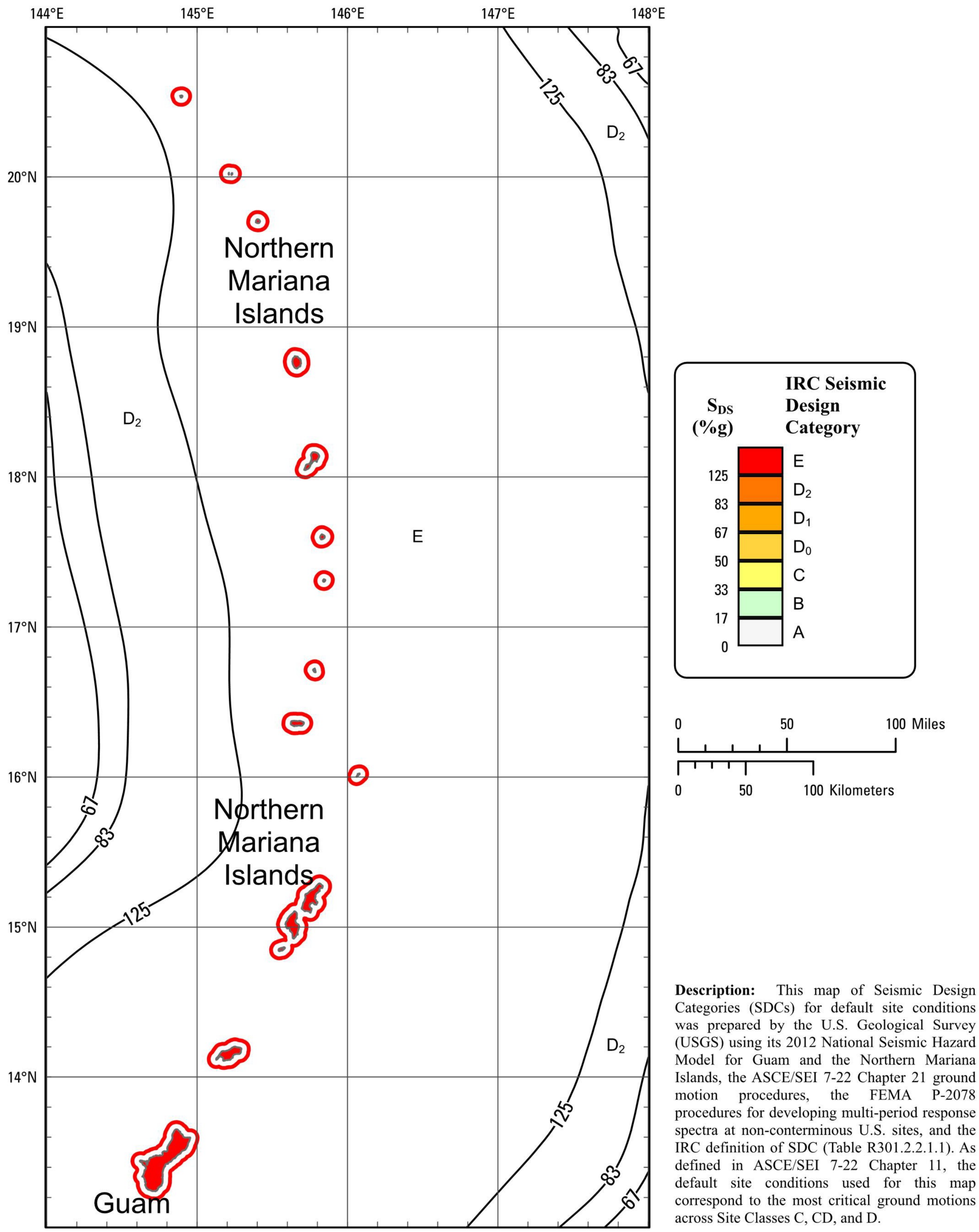
a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures the default Site Class as defined in Chapter 11 of ASCE

R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on 7 .

~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(3)~~ R301.2.2.1(5) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR PUERTO RICO[a]


Explanation
%g
Seismic Design Category
125
83
67
50
33
17
0
E
D2
D1
D0
C
B
A
Northern Mariana Islands
Guam
American Samoa
Swains Island
Tutuila
Aunu'u
Ofu
Olosega
Ta'u
Rose Atoll
100 0 100 200 Miles
100 0 100 200 Kilometers



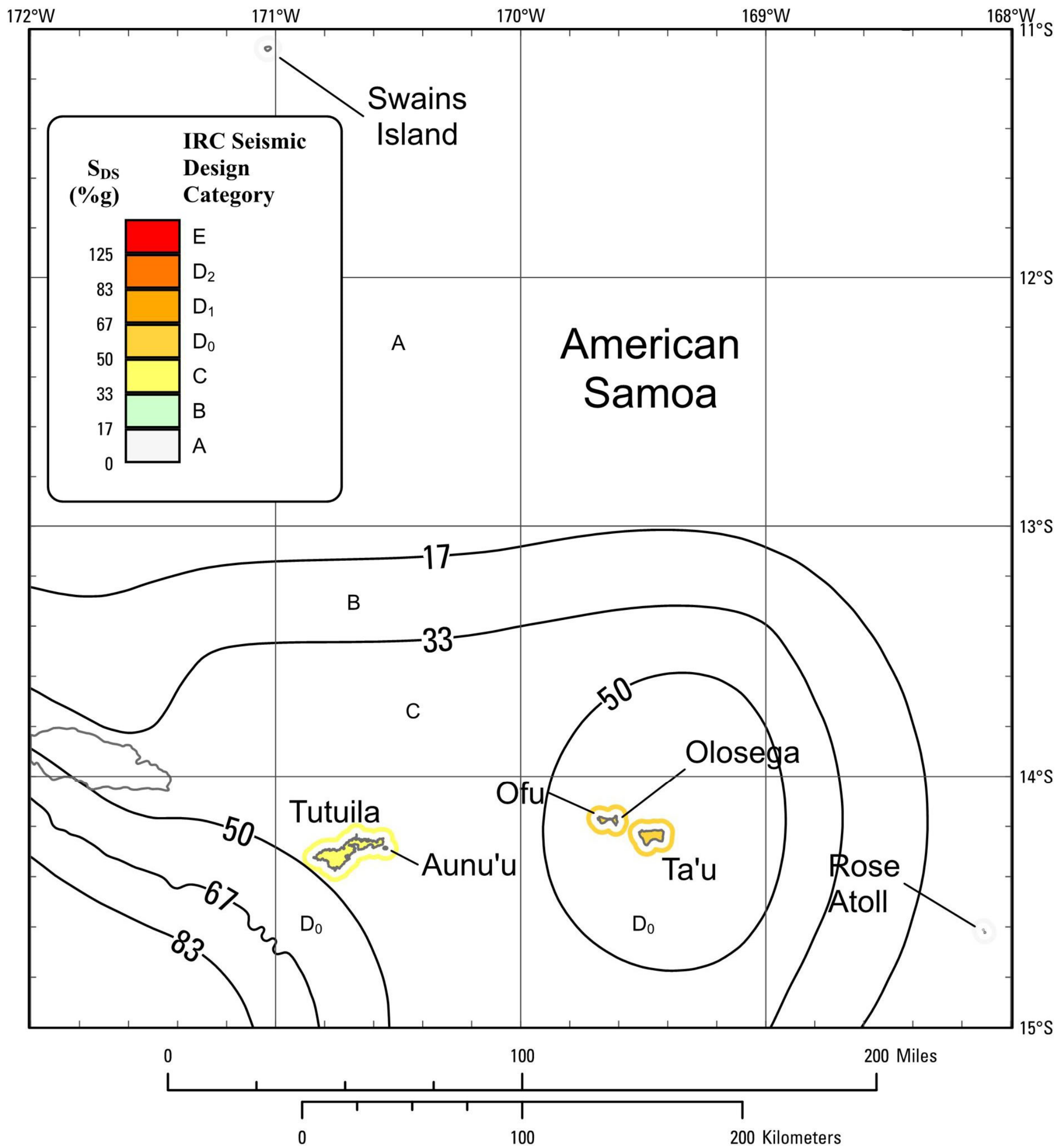
Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for Guam and the Northern Mariana Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through ~~R301.2.2.1(6)~~ R301.2.2.1(7) are based on <u>the default Site Class as defined in Chapter 11 of ASCE 7</u>. ~~soil Site Class D, used as an assumed default, as defined in Section 1613.2.2 of the *International Building Code*.~~

FIGURE ~~R301.2.2.1(4)~~ <u>R301.2.2.1(6)</u> SEISMIC DESIGN CATEGORIES <u>FOR DEFAULT SITE CLASS FOR GUAM AND</u>

THE NORTHERN MARIANA ISLANDS ~~AND AMERICAN SAMOA~~[a]

Add new text as follows:

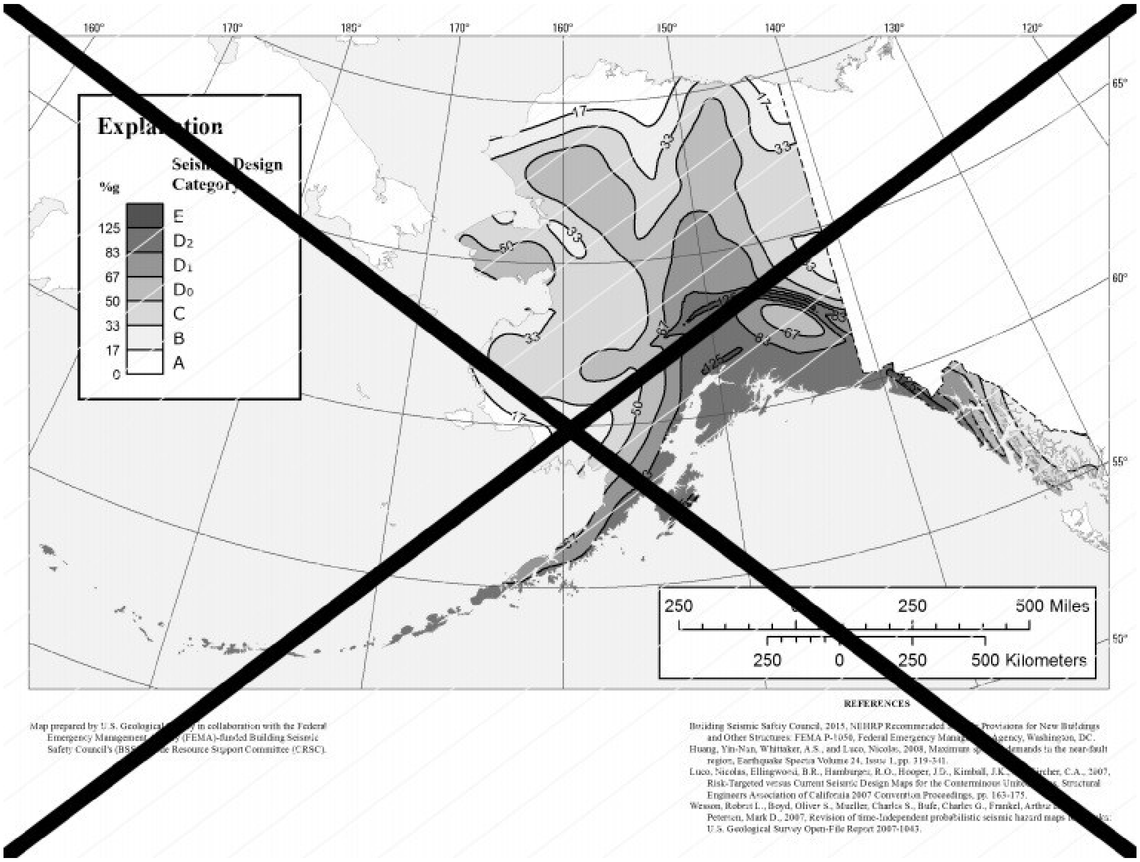


Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1(1) through R301.2.2.1(7), are based on the default Site Class as defined in Chapter 11 of ASCE 7.

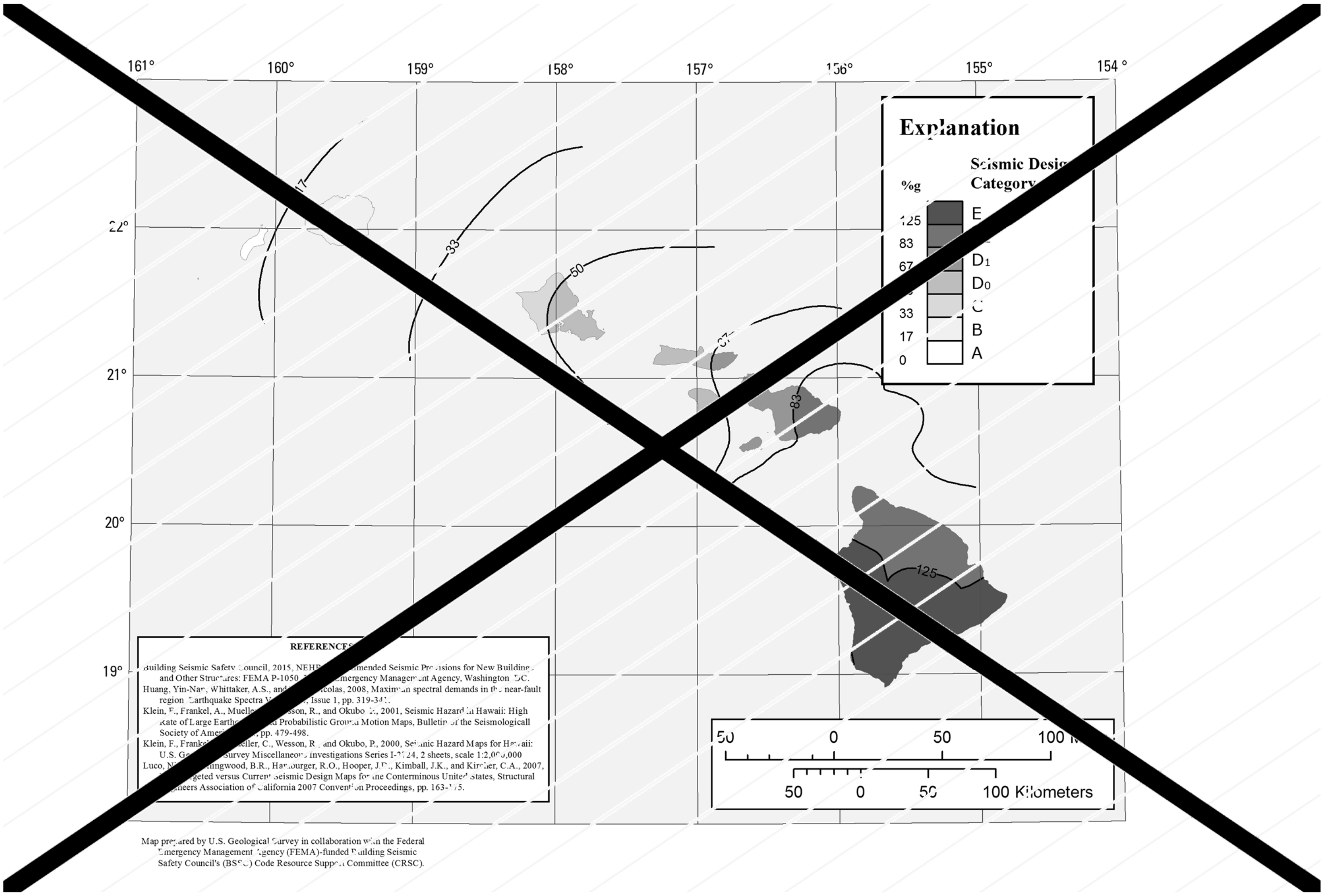
FIGURE R301.2.2.1(7) SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CLASS FOR AMERICAN SAMOA[a]

Delete without substitution:



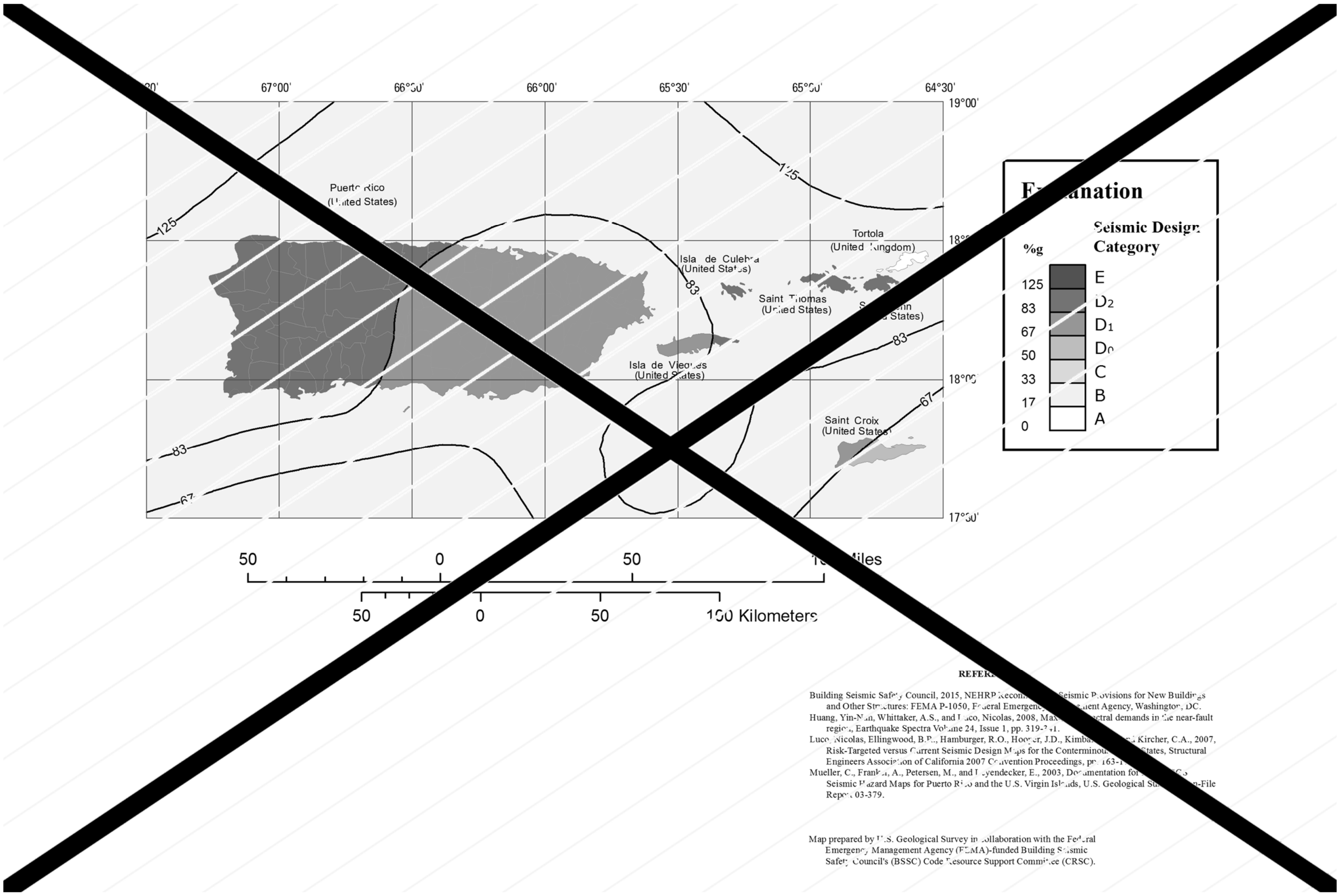
~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(1) ALTERNATE SEISMIC DESIGN CATEGORIES—ALASKA[a]~~



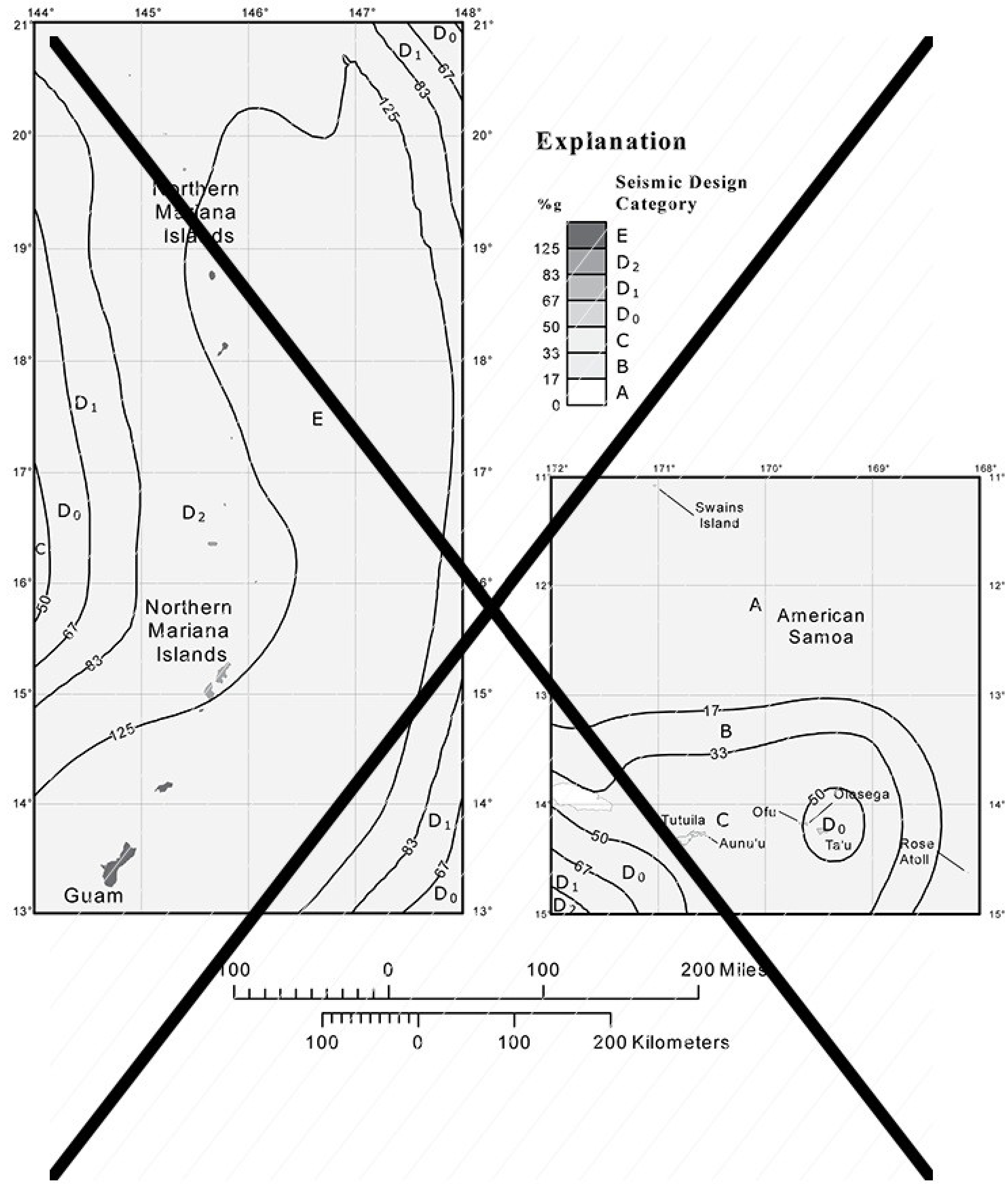
~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~**FIGURE R301.2.2.1.1(2) ALTERNATE SEISMIC DESIGN CATEGORIES—HAWAII[a]**~~



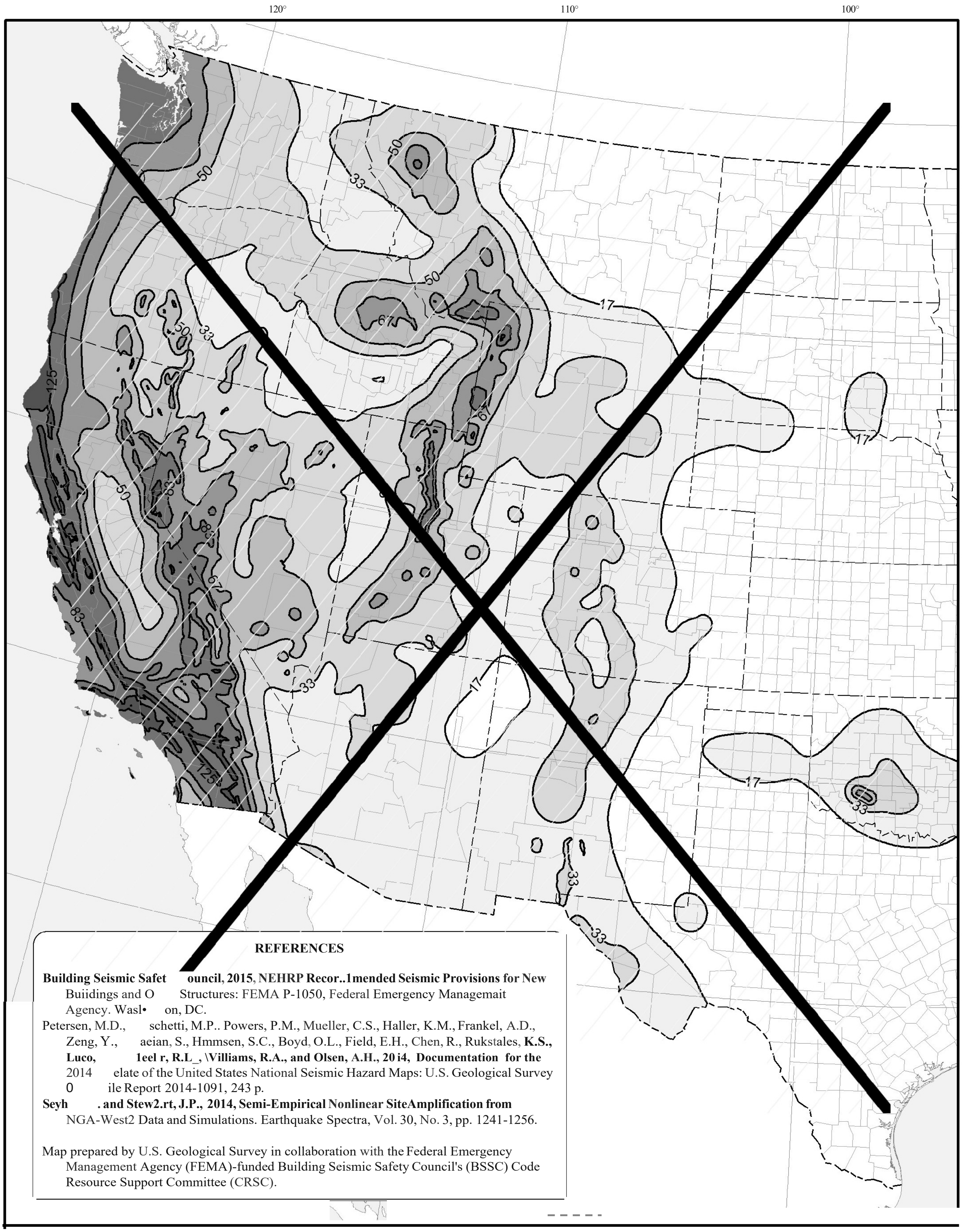
~~a. The seismic design categories and corresponding short-period design spectral response accelerations,~~ ~~S_{DS}~~~~, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(3) ALTERNATE SEISMIC DESIGN CATEGORIES—PUERTO RICO[a]~~



~~a. The seismic design categories and corresponding short-period design spectral response accelerations,~~ $\cancel{S_{DS}}$~~, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(4) ALTERNATE SEISMIC DESIGN CATEGORIES—NORTHERN MARIANA ISLANDS AND AMERICAN SAMOA~~[a] –



REFERENCES

Building Seismic Safet ouncil, 2015, NEHRP Recor..1mended Seismic Provisions for New Buiidings and O Structures: FEMA P-1050, Federal Emergency Managemait Agency. Wasl• on, DC.

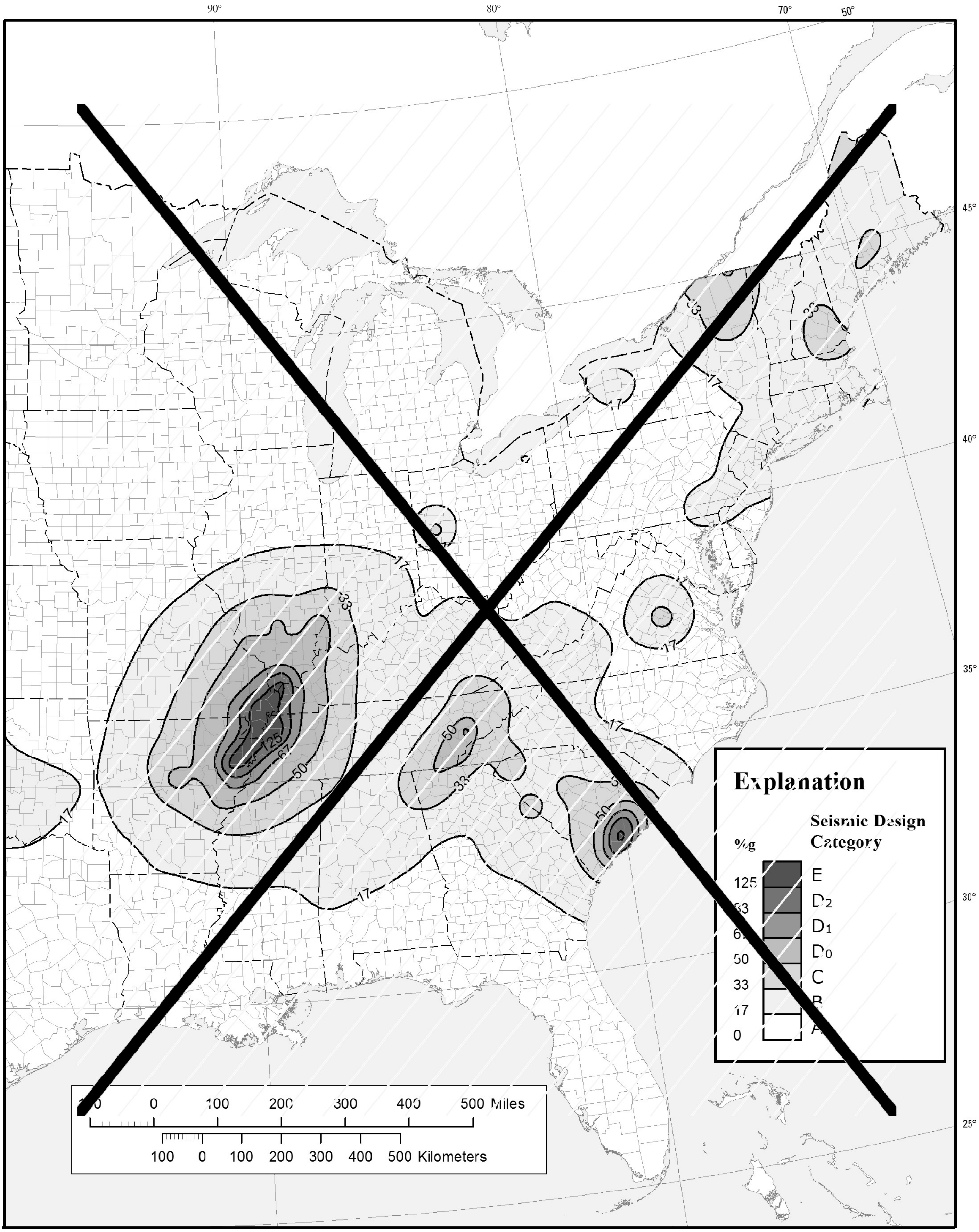
Petersen, M.D., schetti, M.P.. Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Y., aeian, S., Hmmsen, S.C., Boyd, O.L., Field, E.H., Chen, R., Rukstales, **K.S., Luco, 1eel r, R.L_, \Villiams, R.A., and Olsen, A.H., 20 i4, Documentation for the** 2014 elate of the United States National Seismic Hazard Maps: U.S. Geological Survey 0 ile Report 2014-1091, 243 p.

Seyh . and Stew2.rt, J.P., 2014, Semi-Empirical Nonlinear SiteAmplification from NGA-West2 Data and Simulations. Earthquake Spectra, Vol. 30, No. 3, pp. 1241-1256.

Map prepared by U.S. Geological Survey in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council's (BSSC) Code Resource Support Committee (CRSC).

~~a. The seismic design categories and corresponding short-period design spectral response accelerations,~~ ~~S_{DS}~~~~, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(5) ALTERNATE SEISMIC DESIGN CATEGORIES—UNITED STATES~~~~[a]~~


90°
80°
70°
50°
45°
40°
35°
30°
25°
17
33
50
67
125
Explanation
%g
Seismic Design Category
E
D2
D1
D0
C
B
A
125
50
33
17
0
0
100
200
300
400
500 Miles
100
0
100
200
300
400
500 Kilometers

~~a. The seismic design categories and corresponding short-period design spectral response accelerations, S_{DS}, shown in Figures R301.2.2.1.1(1) through 301.2.2.1.1(6) are permitted to be used where soil conditions are determined by the building official to be Site Class A, B or D.~~

~~FIGURE R301.2.2.1.1(6) ALTERNATE SEISMIC DESIGN CATEGORIES—UNITED STATES[a]~~

Revise as follows:

ASCE/SEI

American Society of Civil Engineers
Structural Engineering Institute
Reston, VA 20191-4400

7~~–16 with Supplement 1~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

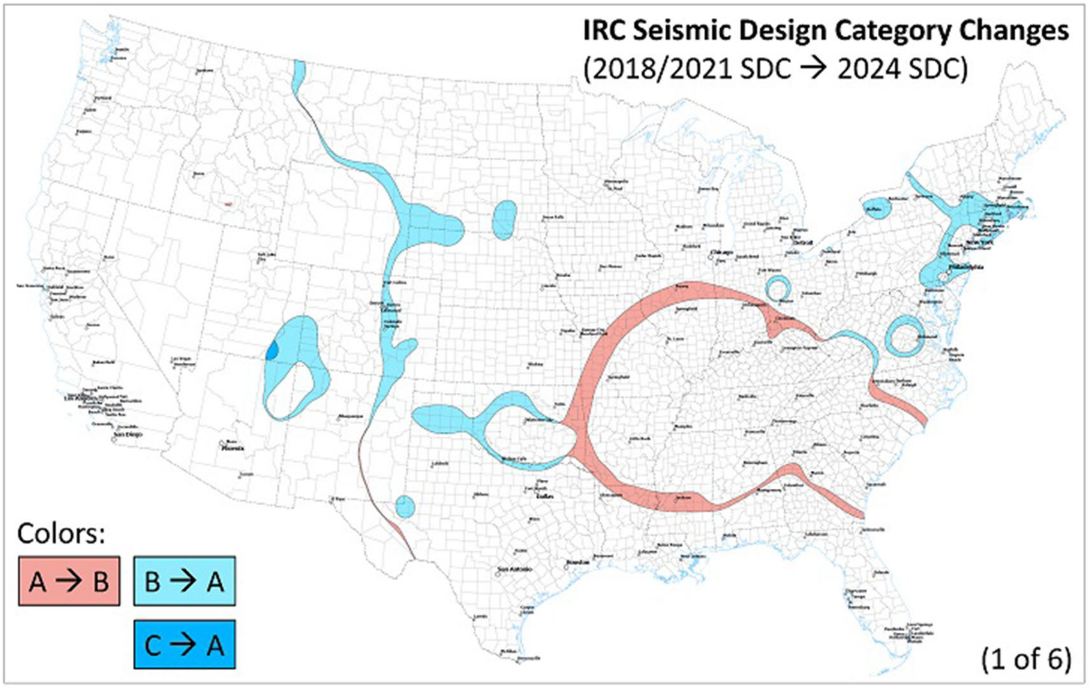
Reason: This proposal updates the IRC Seismic Design Category (SDC) maps to be consistent with updates to the seismic design maps proposed for the IBC (in a separate proposal) and already included in the 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures and ASCE/SEI 7-22. As in past updates, the proposed IRC maps have been developed in collaboration with the U.S. Geological Survey (USGS) and are based on their National Seismic Hazard Models (NSHMs), the site-specific ground motion procedures of the 2020 NEHRP Provisions and ASCE/SEI 7-22 (Chapter 21), and the IRC definition of SDC (Table R301.2.2.1.1). Adoption of these maps will result in a consistent technical basis for the IRC and IBC seismic design maps. Figures at the bottom of this reason statement, prepared by USGS, illustrates the locations where SDC is increasing and decreasing due to this update.
While based on the same mapping of risk-targeted spectral response accelerations as the seismic maps in the 2020 NEHRP Provisions and ASCE/SEI 7-22, for greater ease of use in the IRC, the Seismic Design Category (SDC) is mapped directly. In order to directly map the SDC, the same simplifying assumptions as in prior IRC map updates have been used. First, it is assumed that the dwelling seismic demand is controlled by short-period behavior, allowing mapping based on the short-period design spectral response acceleration parameter, S_{DS}, ignoring the one-second parameter additionally considered in the IBC, S_{D1}. Second, default site (soil) conditions (most critical of Site Classes C, CD, and D) are assumed. With these two assumptions, the mapping information from the 2020 NEHRP Provisions and ASCE/SEI 7-22 are translated to SDC, using Table R301.2.2.1.1. The intent of adopting SDC maps is to spare the non-technical user of the IRC from having to implement the provisions of ASCE/SEI 7 Chapter 11.

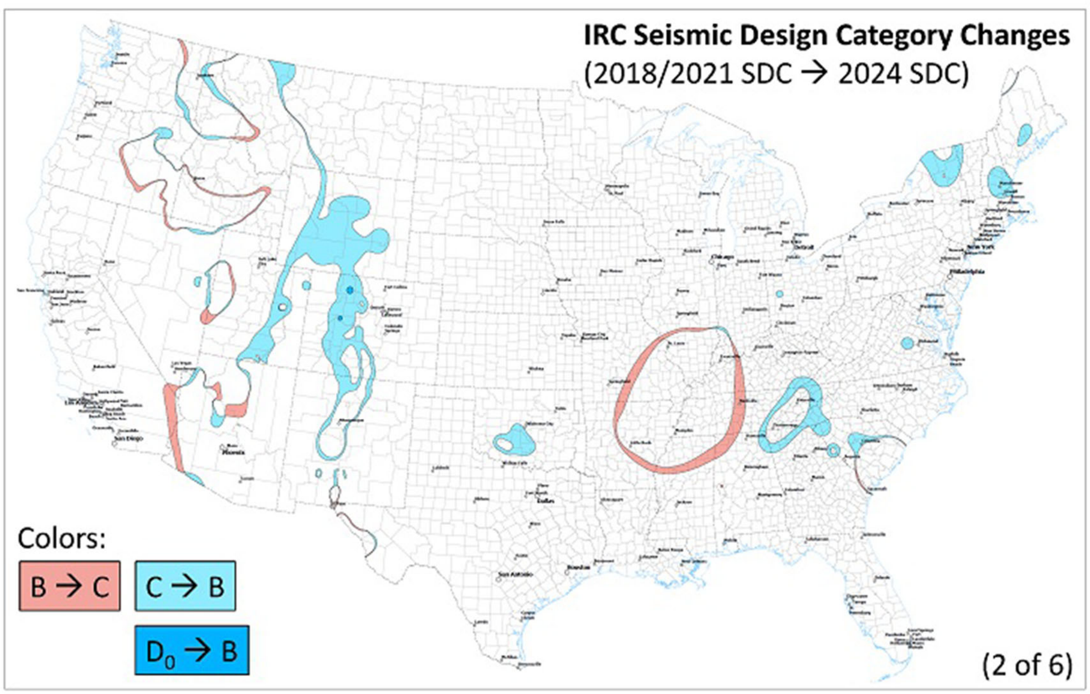
In the 2018 and 2021 editions of the IRC, two separate sets of SDC maps were incorporated. These were identified as the Seismic Design Category Maps (Figures R301.2.2.1(1) through R301.2.2.1(6)) and the Alternate Seismic Design Category Maps (Figures R301.2.2.1.1(1) through R301.2.2.1.1(6)). The Seismic Design Category Maps, consistent with ASCE/SEI 7-16, were determined using default site conditions, defined as the most conservative of Site Classes C and D. Because concern was expressed that use of the SDC maps would cause conservative SDC assignments in some locations relative to the use of Site Class D in previous editions of IRC, Alternate Seismic Design Category Maps were developed based on Site Class D alone and permitted to be used where information was available to justify, to the satisfaction of the building official, that Site Classes A, B, or D could be assigned. These provided reduced SDCs in some locations.

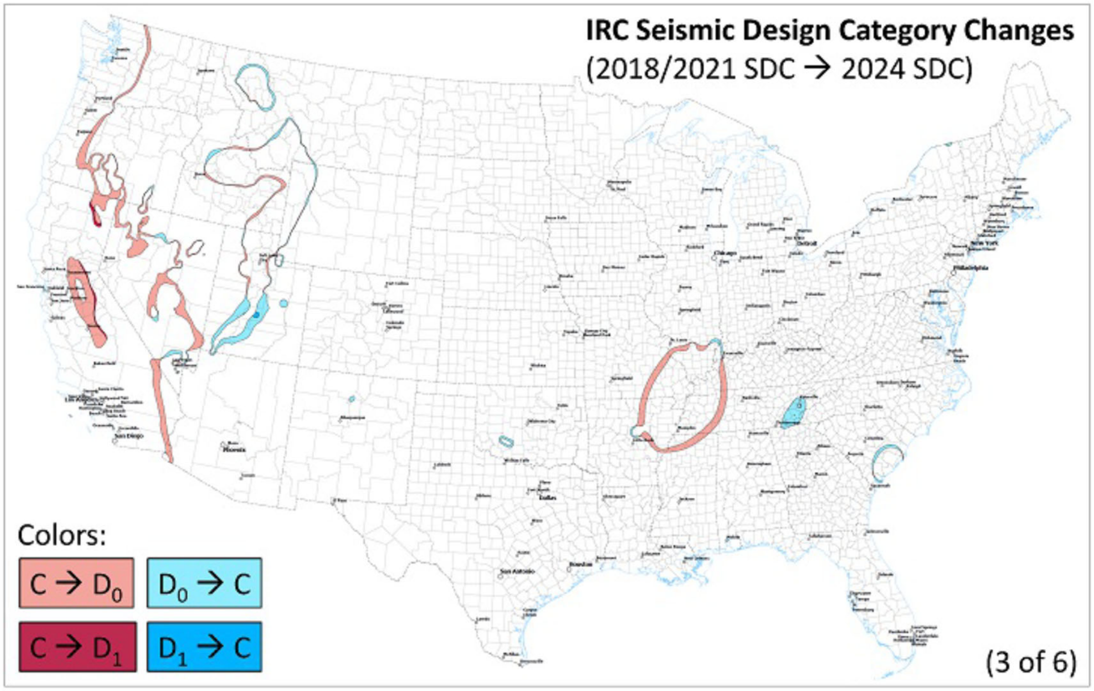
For the 2024 IRC, a single SDC map set is proposed that can be conservatively used for any site, excepting poor soil sites as discussed in Section R401. Because of further changes occurring to site class assignments and default site conditions in the 2020 NEHRP Provisions and ASCE/SEI 7-22, the proposed 2024 IRC maps incorporate the most critical of Site Classes C, CD, and D. This is consistent with default site conditions of the 2020 NEHRP Provisions and ASCE/SEI 7-22, as well as the proposed 2024 IBC maps. The need for an alternative SDC map set was investigated during the development of the proposed 2024 IRC SDC maps; it was found that differences that would occur between the map sets if the alternative map set was developed were in very few locations and of limited effect. As a result, the creation of a second map set was judged to be unnecessary. It is hoped that the return to a single map set will simplify use of the IRC seismic provisions. As in the past, use of the IBC provisions to determine SDC and seismic design parameters is permitted.

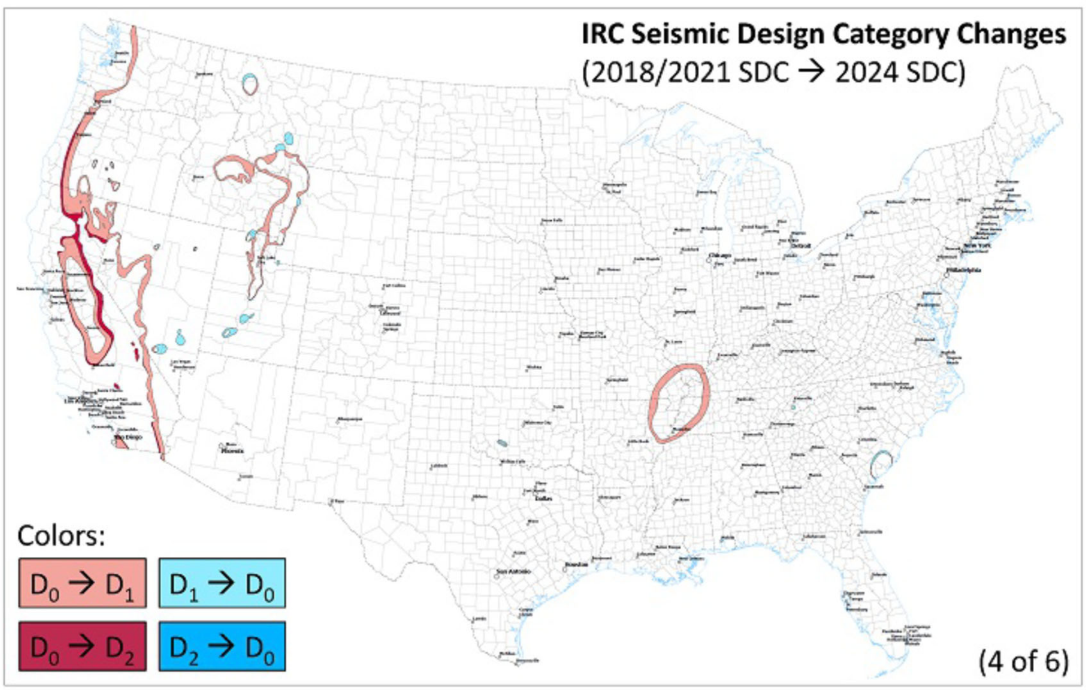
For the conterminous U.S., the proposed updates to the IRC SDC (and IBC) maps, like the map updates already adopted by the 2020 NEHRP Provisions and ASCE/SEI 7-22 are based on (1) recommendations of the Project 17 collaboration between the Building Seismic Safety Council (BSSC) and the USGS (BSSC, 2019), 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 IRC) 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.

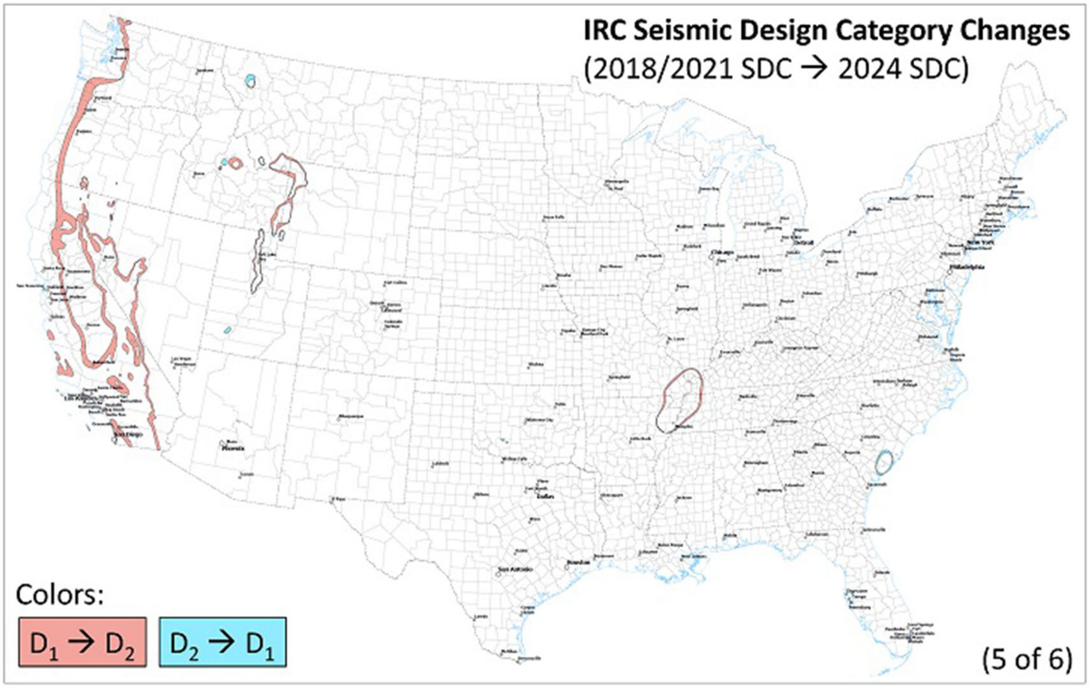
For the states and territories outside of the conterminous U.S., where the existing USGS NSHMs did not yet support direct development of multi-period response spectra (MPRS) needed for the above-mentioned modifications to site-class effects and spectral periods, MPRS were developed using the FEMA P-2078 "Procedures for developing multi-period response spectra at non-conterminous United States sites" (Applied Technology Council, 2020). Via these procedures, the ground motion parameter values for default site conditions were approximated from Site Class BC values of short-period and one-second parameters, using the existing USGS seismic hazard models for Alaska (Wesson et al., 2007), Hawaii (Klein et al., 2001), Puerto Rico and the U.S. Virgin Islands (Mueller et al., 2003), Guam and the Northern Mariana Islands (Mueller et al., 2012), and American Samoa (Petersen et al., 2012). Other relatively minor updates were made to the short-period and one-second Site Class BC values for each region so that they are consistent with the risk-targeted calculations and maximum-direction scale factors used for the conterminous U.S.

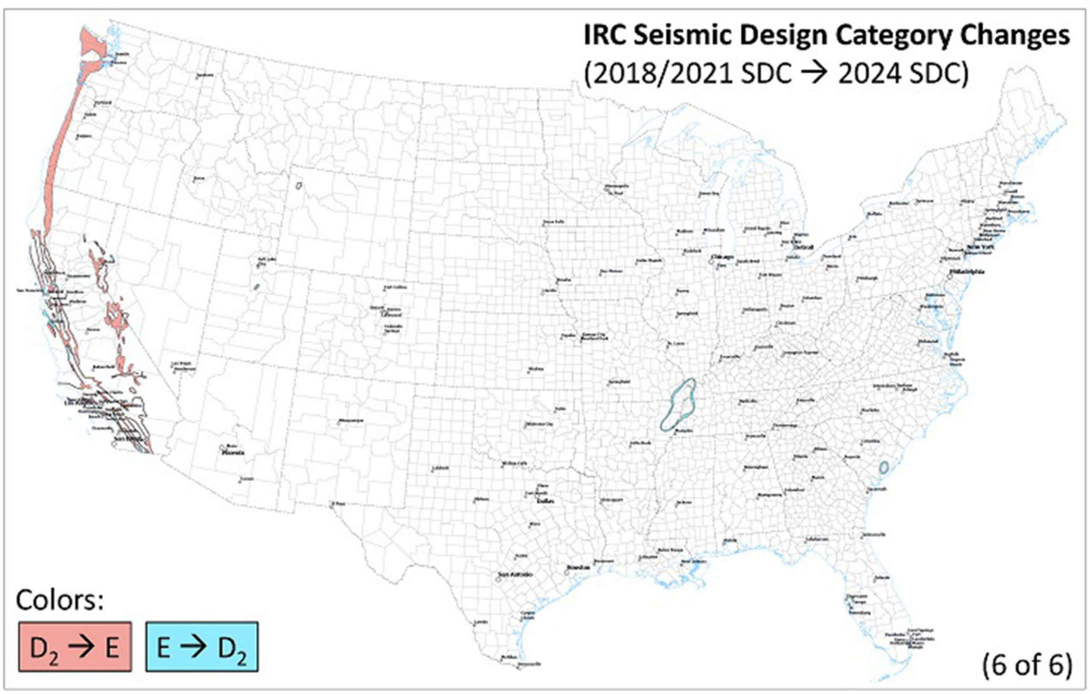





IRC Seismic Design Category Changes
(2018/2021 SDC → 2024 SDC)
Colors:
C → D_0
D_0 → C
C → D_1
D_1 → C
(3 of 6)


IRC Seismic Design Category Changes
(2018/2021 SDC → 2024 SDC)
Colors:
D_0 → D_1
D_1 → D_0
D_0 → D_2
D_2 → D_0
(4 of 6)





Cost Impact: The code change proposal will not increase or decrease the cost of construction

The updated maps result in changes to SDC both upward and downward in a limited number of locations, but do not broadly increase SDC or the cost of construction. An attached file prepared by USGS illustrates the specific locations where SDC is increasing and decreasing. An increase in SDC can result in a nominal increase in cost due to an increase in required amount of seismic bracing, whereas a decrease in SDC will result in a decrease in cost. An increase to SDC E will result in increased cost for seismic design using engineered methods.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it was important to update the IRC with the most recent edition of ASCE7-22 and latest information from 2020 NEHRP which include new modeling and deep basin seismic. The improvements in the maps add simplicity and will improve understanding. (Vote: 10-0)

Final Hearing Results

RB38-22	AS

RB39-22

Original Proposal

IRC: SECTION 202 (New), R301.2.2.10, R301.2.2.10 (New), R301.2.2.10.1 (New), M1307.2, M2301.2.13, G2404.8, P2801.8

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)

2021 International Residential Code

Add new definition as follows:

SYSTEM COMPONENTS.

Mechanical, electrical, plumbing, fuel-gas, fire-protection, photovoltaic, thermal energy, and other components. Such components shall include but are not limited to: utilities and appliances such as water heaters, thermal storage units, HVAC cabinets, and components of a similar height and weight.

Delete without substitution:

~~**R301.2.2.10 Anchorage of water heaters.** In *Seismic Design Categories* D_0, D_1 and D_2, and in *townhouses* in Seismic Design Category C, water heaters and thermal storage units shall be anchored against movement and overturning in accordance with Section M1307.2 or P2801.8.~~

Add new text as follows:

R301.2.2.10 Seismic restraint of system components required. In Seismic Design Categories D_0, D_1, and D_2 and in townhouses in SDC C, system components that are designed to be fixed in position shall be supported and braced or anchored to the structure in accordance with the component manufacturer's recommendations or per Section R301.2.2.10.1.

Exception: Seismic support, bracing, and anchorage are not required for the following:

1. Suspended mechanical ducts, electrical conduit, and plumbing systems that are not part of a fire-suppression or other life-safety system.
2. Where the component or housing is bearing on an elevated floor or roof and the housing height is not greater than 1.5 times the width of the housing base in either direction.
3. Where the component or housing is suspended from the structure less than 7-inches (152.4 mm) below the supporting structural element and the net operating weight is less than 50 pounds per support.
4. Where the operating weight of the component and its housing is less than 400 pounds and is less than 4 feet above floor level.

R301.2.2.10.1 Seismic restraint resistance. Supports, bracing, and anchorage of system components in Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Category C, shall resist a horizontal force equal to one-third times the operating weight of the component, acting in any direction. Bracing shall comply with the following:

1. Components supported at the base shall be braced with strapping at points within the upper one-third of the component's vertical dimensions, or the component anchorage shall be designed to resist overturning.
2. Components suspended from the structure shall be braced to the structure, using either flexible or rigid bracing. Flexible bracing such as wires or straps shall be provided in each of the four orthogonal directions. Rigid bracing such as struts or bars may be provided in two orthogonal directions.

Revise as follows:

M1307.2 Anchorage of appliances. *Appliances* designed to be fixed in position shall be fastened or anchored in an*approved* manner. In Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Category C, water heaters and thermal storage units shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in accordance with Section R301.2.2.10.~~one of the following:~~

1. ~~Anchorage and strapping shall be designed to resist a horizontal force equal to one-third of the operating weight of the water heater storage tank, acting in any horizontal direction. Strapping shall be at points within the upper one-third and lower one-third of the *appliance's* vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102 mm) above the controls.~~
2. ~~The anchorage strapping shall be in accordance with the appliance manufacturer's recommendations~~.

M2301.2.13 Thermal storage unit seismic bracing. In *Seismic Design Categories* D_0, D_1 and D_2 and in townhouses in Seismic Design Category C, thermal storage units shall be anchored in accordance with Section R301.2.2.10. ~~M1307.2.~~

G2404.8 Seismic resistance. Where earthquake loads are applicable in accordance with this code, the supports shall be designed and installed for the seismic forces in accordance with Section R301.2.2.10 ~~this code~~.

P2801.8 Water heater seismic bracing. In Seismic Design Categories D_0, D_1 and D_2 and townhouses in Seismic Design Category C, water heaters shall be anchored in accordance with Section R301.2.2.10. ~~or strapped in the upper one-third and in the lower one-third of the *appliance* to resist a horizontal force equal to one-third of the operating weight of the water heater, acting in any horizontal direction, or in accordance with the *appliance* manufacturer's recommendations.~~

Reason: This proposal clarifies currently undefined IRC seismic restraint requirements for non-structural systems that pose a hazard if displaced during an earthquake. This proposal provides prescriptive direction that does NOT require a registered design professional, but still allows compliance with the intent of the IRC.
The new Section R301.2.2.10 makes use of current IRC language, while adjusting the provisions to better suit a variety of sizes and shapes. Exceptions have been added to limit the scope so that only larger and heavier components are subject to the required restraint. The limits on these exceptions have been correlated with ASCE 7 Chapter 13, which in some instances reduced the scope of the requirements (i.e. 300 lb limit has been increased to a 400 lb limit). These exclusions prevent components like common ductwork, electrical conduit, etc. from being subject to additional and unnecessary restraints.

By consolidating the seismic restraint requirements into Chapter 3, users no longer have to jump between chapters and the requirements can be uniformly defined without contradictions. This also follows the established precedent to define applicable scope criteria for seismic provisions within Chapter 3.

Issue this Addresses

While sections such as G2404.8 reference "seismic forces in accordance with this code", the IRC does not provide direction on how to determine the "seismic forces" or how to select anchorage and bracing that will support that force. As a result, the user is left with a choice between the responsibility of properly selecting the anchorage and bracing themselves or turning to an engineered solution to truly comply with the IRC.

Utility and non-structural systems other than water heaters (M1307.2) and thermal storage units (M2301.2.13) are just as vulnerable to displacement during an earthquake but are not explicitly covered by the current language. Displacements of these systems pose as much or more of a hazard than water heaters, from falling debris, containment failure of systems, or gas leaks within the residence. The current IRC provisions provide insufficient direction on how to adequately brace non-structural systems other than water heaters.

Cost Impact: The code change proposal will increase the cost of construction
The cost increase will be small since the anchorage and bracing can be achieved with typical construction materials readily available from local hardware stores. Non-structural items subject to this proposal can be braced with coil strapping, wire bracing, or rigid struts with approximate costs as follows:

- $9 - $15 => basic water heater strap kit
- $36 - $42 => 25-feet of 20-gage coil strapping

- \$6 - \$10 => 175-feet of 20-gage galvanized steel wire
- \$21 - \$35 => 10-foot long 14-gage channel strut

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
Delete without substitution:
~~**SYSTEM COMPONENTS.** Mechanical, electrical, plumbing, fuel-gas, fire-protection, photovoltaic, thermal energy, and other components. Such components shall include but are not limited to: utilities and appliances such as water heaters, thermal storage units, HVAC cabinets, and components of a similar height and weight.~~
Revise as follows:

R301.2.2.10 Seismic restraint of ~~system components~~ *appliances* and *equipment* ~~required~~.
In Seismic Design Categories D_0, D_1, and D_2 and in townhouses in SDC C,~~system components~~ *appliances* and *equipment* that are designed to be fixed in position shall be supported and braced or anchored to the structure in accordance with the component manufacturer's recommendations or per Section R301.2.2.10.1.

Exception: Seismic support, bracing, and anchorage are not required for the following:

1. Suspended mechanical ducts, electrical conduit, automatic sprinkler systems, and plumbing systems. ~~that are not part of a fire-suppression or other life-safety system.~~
2. Where the ~~component or housing~~ *appliance* or *equipment* is bearing on an elevated floor or roof and the housing height is not greater than 1.5 times the width of the housing base in either direction.
3. ~~Where the component or housing is suspended from the structure less than 7-inches (152.4 mm) below the supporting structural element and the net operating weight is less than 50 pounds per support.~~ Where the installed weight of a suspended appliance or equipment is 50 pounds or less.
4. ~~Where the operating weight of the component or housing is less than 400 pounds andis less than 4 feet above floor leve~~l. Where the installed weight is 400 pounds or less and the bottom of the*appliance* or *equipment* is 4 feet or less above the adjacent floor level.

Committee Reason: The modification to delete the definition of 'system components' was appropriate because this is already addressed in the defined terms for 'appliances' and 'equipment'. With the definition deleted, the change to Section R301.2.2.10.1 main paragraph and Exception 2 are correlation with that deletion. The modification to Section R301.2.2.10.1 Exception 1, is because 'lift safety system' is too broad; this should be limited to automatic sprinkler systems. The modification to Section R301.2.2.10 Exceptions 3 and 4 were a simplification/clarification of what items are expected to be braces.
The proposal was approved as modified because this proposal provides seismic constraint for heavy equipment and appliances in residential construction which is important for resiliency and for addressing seismic force hazards. (Vote: 10-0)

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., 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) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

R301.2.2.10.1 Seismic restraint resistance. Supports, bracing, and anchorage of *appliances* and *equipment* ~~system components~~ in Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Category C, shall resist a horizontal force equal to one-third times the operating weight of the component, acting in any direction. Bracing shall comply with the following:

1. Components supported at the base shall be braced with strapping at points within the upper one-third of the component's vertical dimensions, or the component anchorage shall be designed to resist overturning.
2. Components suspended from the structure shall be braced to the structure, using either flexible or rigid bracing. Flexible bracing such as wires or straps shall be provided in each of the four orthogonal directions. Rigid bracing such as struts or bars may be provided in two orthogonal directions.

Commenter's Reason: The original proposal introduced the phrase "system components", which was replaced by "*appliances* and *equipment*" with a floor modification approved by the committee. This public comment is an editorial change to clean up a stray reference that was overlooked.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The cost increase will be as stated in the original proposal. This public comment is an editorial change.

Final Hearing Results

RB39-22	AMPC1

RB42-22

Original Proposal

IRC: R301.2.4, R322.1

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)

2021 International Residential Code

Revise as follows:

R301.2.4 Floodplain construction. Buildings and structures constructed in whole or in part in flood hazard areas ~~(including A or V Zones) as~~ established in Table R301.2, and substantial improvement and*repair* of substantial damage of buildings and structureslocated in whole or in part in flood hazard areas, shall be designed and constructed in accordance with Section R322. Buildings and structures that are located in more than one flood hazard area, including A Zones, Coastal A Zones, and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas~~, including A or V Zones and Coastal A Zones, as~~ established in Table R301.2, and substantial improvement and*repair* of substantial damage of buildings and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures that are located in more than one flood hazard area, including A Zones, Coastal A Zones, and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

Reason: This proposal makes it clearer that the flood provisions that apply to both new dwellings and substantially improved or substantially damaged dwellings must comply when located in whole or in part in flood hazard areas. It further clarifies what is meant by “located in more than one flood hazard area.” The NFIP requires buildings that straddle a boundary between two zones meet the requirements of the more restrictive flood zone. The proposal also results in R301.2.4 and R322.1 using the same phrasing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal relocates and explains what is meant by “located in more than one flood hazard area.” There is no change to the technical content of the provisions. By clarifying existing requirements, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because this provides clarification for requirements for new buildings or substantially improved buildings located within or partially within a flood zone. (Vote: 10-0)

Final Hearing Results

RB42-22 AS

RB44-22

Original Proposal

IRC: TABLE R301.7

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

2021 International Residential Code

R301.7 Deflection. The allowable deflection of any structural member under the *live load* listed in Sections R301.5 and R301.6 or wind loads determined by Section R301.2.1 shall not exceed the values in Table R301.7.

Revise as follows:

TABLE R301.7 ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[b, c]

Portions of table not shown remain unchanged.

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
All other structural members excluding guards and handrails.	*L*/240

Note: *L* = span length, *H* = span height.

a. For the purpose of the determining deflection limits herein, the wind load shall be permitted to be taken as 0.7 times the component and cladding (ASD) loads obtained from Table R301.2.1(1).

b. For cantilever members, *L* shall be taken as twice the length of the cantilever.

c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or 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 sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *L*/120.

d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of *H*/180.

e. Refer to Section R703.8.2. The dead load of supported materials shall be included when calculating the deflection of these members.

Reason: This proposal eliminates guards and handrails from the IRC allowed deflection table and removes the requirement that conflicts with the long accepted standards related to Guards and Handrails.

Guards and handrails are structural members listed in Table R301.5. However without a specific listing for allowable deflection in Table R301.7 they are caught in the catch all of “All other structural members” by default. It is our belief that guards and handrails fall in this category as an unintentional oversight. The allowances in this table are intended for elements of the building's envelope and core structure, e.g., floor, ceilings, roof, and walls to limit vibration and prevent cracking of applied finishes. As stated in R301.7 the deflection allowances in the table are to be considered under the required live load, which for these elements are uniformly distributed live loads. However, the loads on guards and handrails are concentrated loads to correlate with their function that is uniquely different from floors, walls, etc.

The default "All other..." allowed deflection of only L/240 is simply not enforceable nor is it being enforced. L/240 is over restrictive for the length of any guard system, as guards are not susceptible to the same kind of loading as floors, nor does regulating deflection of length address deflection of height which is a critical parameter when applying the required load to the top of the guard. Any horizontal deflection of the guard system as the user experiences it is dependent upon the vertical support when the required live load is applied to the top of a guard system. Height may not be a factor in deflection of a handrail system depending upon how it is mounted as with a rail mounted to a wall with brackets. However, in any case it is plain to see L/240 does not factor in height of the guard.

Guards are commonly made of many different materials, wood, steel, aluminum, miscellaneous metals, glass, composites, plastics, etc. each having unique properties affecting deflection. Guards and handrails of each of these materials have been manufactured based upon the requirements of long accepted standards:

ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*,
ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*,
ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*.

These standards represent current practice for testing the deflection of manufactured guard systems and their approval by ICC-ES acceptance criteria as well as other product evaluators that use the same ASTM Tests. Such approved products are common throughout the built environment. If enforced L/240 would eliminate these products without any evidence contrary to their serviceability. Furthermore in the supporting statement of RB61-13, Cole Graveen PE, SE, the proponent stated:

> "*It should be noted that if the current deflection limit of L/240 for All other structural members is applied to wood guards on common residential decks, as it should be per the current text of the IRC, it is highly likely that many of the typical wood guard constructions would not comply with L/240. The deflection of a typical mid-grade wood 4x4 post connected to a 2x10 band joist will exceed L/240 when both the bending deflection of the post and the rotation of the support is considered.*"

RB61-13 suggested that L/240 be replaced with the requirements set forth in the standards cited above that are used to approve product by the ICC. RB61-13 was disapproved. This proposal however simply eliminates guards and handrails from the IRC allowed deflection Table R301.7and removes any conflict with the long accepted standards.

We will also propose an amended version of RB16-13 with a substitution for L/240 in an attempt to harmonize the IRC with the long existing standards cited above and as the proponent it is our intention to ask that it be heard first.

Bibliography: 1. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2009
2. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2017 (updated 2021)
3. ASTM E985-00(2006), Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
4. ASTM E985-00 E1, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
5. ASTM D7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)
6. Loferski, J., Albright, D., and Woeste, F. (July 2007) Tested Guardrail Post Connections for Residential Decks, Structure Magazine
7. Review of Fall Safety of Children Between the Ages of 18 Months and 4 Years in Relation to Guards and Climbing in the Built Environment, Prepared for National Ornamental & Miscellaneous Metals Association (NOMMA), Prepared by NAHB Research Center, Inc., December 2007
8. Horizontal Static Forces Exerted by Men Standing in Common Working Positions on Surfaces of Various Tractions - Including Coefficients of Friction Between Various Floor and Shoe Materials, K. H. E. Kroemer, et al, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, January 1971
9. RB61-13, 2013 Code Development Cycle of the 2015 International Residential Code

Cost Impact: The code change proposal will decrease the cost of construction

Based upon the premise that the code will be enforced as written this will at the very least prevent a landslide of re-evaluation and testing subsequent to obsolescence of many guard and handrail products, all at an undetermined increase in cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved because the L/240 deflection limit is not needed for guards. Safety is addressed by the current loading requirements. (Vote: 10-0)

Final Hearing Results

RB44-22	AS

RB45-22

Original Proposal

IRC: R301.9 (New), R502.3, R802.4.1, R802.5
Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

R301.9 Framing Member Splices. Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

Revise as follows:

R502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

R802.4.1 Rafter size. Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance withSection R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1). Rafter splices shall comply with Section R301.9.

Reason: This proposal adds language to address members spliced between bearing walls. The clear spans and loads provided in all IRC tables assume a continuous condition between supports. Although a continuous member can be achieved by splicing two members together, the splice must be properly designed to transfer forces across the spliced connection and avoid a hinge condition.
Where splices have not been properly designed, members (especially rafters) have displayed visible out-of-plane deformation. In these situations, the members have required repair or replacement to stop and reverse the deformation process.
This proposal clarifies that framing member splices between bearing walls need to be engineered and references section R301.1.3. Engineered design.

"Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the International Building Code is permitted for buildings and structures, and parts thereof, included in the scope of this code."

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 clarification change only; the intent is to clarify Rafter splices need to be engineered which is what required currently but

it is not addressed in the code text.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because this is already addressed adequately in the wood sections. Splices have to be engineered or should be prohibited; so they should not be promoted by including this in Chapter 3. This does not address all splices, some are not structural, so these provisions would be too restrictive. (Vote: 10-0)

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 Residential Code

~~**R301.9 Framing Member Splices.**~~ ~~Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.~~

R502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall ~~comply with Section R301.9~~. occur over vertical supports or shall be designed in accordance with R301.1.3.

R802.4.1 Rafter size. Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. ~~Joist~~ Rafter splices shall ~~comply with Section R301.9~~. occur over vertical supports or shall be designed in accordance with R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance with Section R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1). ~~Rafter~~ Ceiling joist splices shall ~~comply with Section R301.9~~. occur over vertical supports or shall be designed in accordance with R301.1.3.

Commenter's Reason: The Committee raised the concern that adding a generic splice section in Chapter 3 could lead to unintentionally requiring or promoting splices beyond the specific problematic framing conditions. In response, this public comment eliminates the generic splice section and relocates the proposed language into the three specific sections that address floor joists, rafters, and ceiling joists. This relocation of text will limit these specific splice requirements only to the three areas intended to be addressed by this proposal.
The allowable framing table spans in the IRC assume members are continuous between their supports. Without that continuity, the table spans and framing sizes are inadequate to support the required loads and result in localized and visible deflections. These deflections cause both cosmetic damage such as cracked gypsum board, and more functional damage such as racked doors that do not close or broken plumbing where it has been run through deflected floor joists. A continuous member can be achieved by using a single solid member or by using a splice that transfers the full member section capacity between pieces. This proposal addresses the spliced condition and typical field splice practices that are frequently inadequate to support the required loads.

The opposing testimony raised a concern that the proposed language could be interpreted to allow bearing walls only to be considered a vertical support. Where a splice occurs over a vertical support, the support provides the necessary restraint against deflection and meets the intent of the prescriptive framing table spans. Vertical supports include any IRC allowable bearing surface or support element, including but not limited to: girders, trusses, bearing walls, etc.

The final concern raised was that splices have not been an issue and this is unnecessary language. Field splices are frequently used to extend framing members that are too short to reach the bearing point (see photograph).

Where a splice occurs between vertical supports, the splice must transfer the full section capacity between pieces for the framing to achieve the expected performance based on the prescriptive framing tables. Specific member splice requirements will depend on the member size, material grade, and environmental exposure (interior, exterior, etc) and must be designed in accordance with accepted engineering practices. As roof pitches become increasingly steep longer rafter spans are required. As modern floor plans increase open spaces, longer ceiling and floor joist spans are required. As a result, field splices are regularly identified as deficient and the cause of framing performance issues or failures.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction These are existing requirements. There was a lot of confusion about the continuity of Joists, Rafters, and Ceiling joists. All the prescriptive provisions in the IRC are based on continuous Joists, Rafters, and Ceiling joists. This proposal provides clarification to the code users on the existing requirements without affecting the cost.

Final Hearing Results

RB45-22	AMPC1

RB47-22

Original Proposal

IRC: R302.1

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

2021 International Residential Code

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings*, *townhouses* and ~~accessory buildings~~*accessory structures* shall comply with Table R302.1(1) based on *fire separation distance*; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance*.

For the purposes of determining *fire separation distance*, *buildings* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *building* is to be erected on the same *lot* as an *existing building*, the location of the assumed imaginary line with relation to the *existing building* shall be such that the *existing building* meets requirements of this section.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of individual *dwelling units* and their *accessory structures* that face each other and are located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* or *townhouse* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: The main purpose of this proposal is to add language into the body of the code that specifically dictates where imaginary lines must be assumed to determine fire separation distance. Currently, the definition of fire separation distance includes a distance to an imaginary line between two buildings on a lot, but the code doesn't tell you where an imaginary line must be assumed. Without specific language in the code that states where an imaginary line must be assumed, this part of the fire separation distance definition is somewhat moot. The proposed language addresses projects with multiple buildings on a lot, as well as when a new building is added to an existing lot. It should be noted that Exception 2 exempts walls between dwelling units and their accessory structures from fire-resistant exterior wall requirements and this proposal does not change this as the exception still applies.

There is a definite need to measure fire separation distance to an imaginary line between two buildings on lot as there are many projects with multiple dwellings or townhouses on the same lot and this requirement helps to prevent spread of fire from one building to the next (safety to property from fire is part of the intent of the code per Section 101.3). Furthermore, the alarm systems of these buildings are not tied together so it is appropriate to provide these buildings with the same protection as would be provided if the buildings were on separate lots (safety to life from fire is part of the intent of the code per Section 101.3).

This proposal also provides other improvements to this section as follows:

1. Adds the defined term "fire separation distance" into the body of this section. This defined term currently only occurs in an exception and in the tables referenced, which is not typical code language.

2. "accessory buildings" is changed to the defined term "accessory structures".

3. Townhouses are added to the scoping of the exterior wall requirements.

4. Exception 2 is revised to clarify that the exception only applies to walls of individual dwelling units and their accessory structures that face

each other. As currently written, this exception could be read to apply to all walls of the dwelling units and accessory structures.

5. "Individual" in Exception 2 is revised to not be in italics as this is not a defined term.

6. Exception 4 for detached garages is revised to include garages accessory to a townhouse.

I urge your support of this proposal as it brings much needed clarity to the code regarding where imaginary lines must be assumed and provides several other improvements to the language of this section. These changes will aid in consistent interpretation and enforcement of fire-resistant exterior wall requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Along with miscellaneous editorial changes, this proposal adds requirements to the body of the code that are already in the definition of 'fire separation distance', with no change in technical content of the code, therefore, there will be no change in cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved because it is not clear what the difference in hazard is with accessory building and the main building. The phrase "face each other" is not easy to understand. "Accessory structure" is too broad of a term (e.g. carports), so how would you separate them? (Vote: 8-2)

Public Comments

Public Comment 1

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

Modify as follows:

2021 International Residential Code

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings, townhouses* and ~~*accessory structures*~~ accessory buildings shall comply with Table R302.1(1) based on *fire separation distance*; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance*.

For the purposes of determining *fire separation distance*, ~~*buildings*~~ *dwellings* and *townhouses* on the same *lot* shall be assumed to have an imaginary line between them. Where a new ~~*building*~~ *dwelling* or *townhouse* is to be erected on the same *lot* as an *existing* ~~*building*~~ *dwelling* or *townhouse*, the location of the assumed imaginary line with relation to the *existing* ~~*building*~~ *dwelling* or *townhouse* shall be such that the *existing* ~~*building*~~ *dwelling or townhouse* meets requirements of this section.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of individual *dwelling units* and their accessory buildings ~~*accessory structures* that face each other and are~~ located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.

4. Detached garages accessory to a *dwelling* _*unit*_ ~~*or townhouse*~~ located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Commenter's Reason: This public comment modifies the original proposal to address concerns raised in the committee action hearings and to coordinate with another proposal that was approved in the committee action hearings. Modifications are as follows:
1. There was a concern that "accessory structures" is too broad of a term and would add non-building structures into this section that are not intended to be regulated by this section. This was not the intent of the proposal, so this public comment modifies the first sentence to change "accessory structures" back to "accessory buildings", which is the current IRC wording. Also, Exception 2 is revised to change "accessory structures" to "accessory buildings" to be consistent with the wording in first sentence. The intent of the original proposal was to make the wording in R302.1 consistent with the wording in exception 2 and this change is consistent with the original intent and resolves a current conflict in the wording.

2. For Exception 2, there was a concern that the added phrase "that face each other" is not clear and is open to interpretation. We agree with this concern and this public comment removes the added wording in this exception, so there is no change to the current wording of Exception 2 except as noted in Item 1 above.

3. To further clarify the intent of this proposal and avoid any confusion with accessory structures/buildings, the second paragraph for imaginary line requirements is modified to change "buildings" to "dwellings and townhouses". This is done since the definition of "building" includes "accessory structure", which would then bring in non-building structures. The definitions of "dwelling" and "townhouse" are clear that these are buildings that contain dwelling units, which is the main focus of the original proposal.

4. Exception 4 is changed simply to coordinate with proposal RB14-22 that was approved in the committee action hearing by a vote of 10-0. Proposal RB14-22 clarified the use of the defined words "dwellings" and "townhouses" throughout the IRC and it should be noted that the change in this proposal that adds townhouses to the scoping in the first sentence is also included in RB14-22 which has been approved.

Opposition to this proposal raised a concern that bringing townhouses into R302.1 may conflict with townhouse requirements in R302.2. As was stated during testimony, R302.1 is specific to exterior walls of a townhouse, which is now defined as a building that contains three or more attached townhouse units - in other words, R302.1 regulates the perimeter walls of the entire townhouse building. R302.2 on the other hand regulates walls that separate individual townhouse units. There is absolutely no conflict between these sections as they deal with two very different items. Also, as noted in Item 4 above, the addition of townhouses to this section was already approved in RB14-22.

With the modifications made in this public comment we believe all of the concerns raised in the committee action hearing have been addressed. The main purpose of this proposal is to address measurement of fire separation distance for the case where there are multiple dwelling or townhouse buildings on the same lot, which is needed to prevent the spread of fire from one building to another and protect property. The concept of an imaginary line between buildings currently only occurs in the definition of "fire separation distance" and this proposal will bring clarity to the code by adding specific requirements for when the imaginary line is to be used. Please support this proposal 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
This proposal and public comment add requirements to the body of the code that are already in the definition of "fire separation distance", with no change in the technical content or intent of the code; therefore, there will be no change in the cost of construction.

Final Hearing Results

RB47-22	AMPC1

RB48-22

Original Proposal

IRC: SECTION 202, R302.1

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

2021 International Residential Code

Revise as follows:

[RB] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior *lot line*.
2. To the centerline of a street, an alley or public way.
3. To an imaginary line between two buildings or<u>*townhouse units*</u> on the *lot*.

The distance shall be measured at a right angle from the face of the wall.

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of*dwellings* and accessory buildings shall comply with Table R302.1(1); or *dwellings* equipped throughout with an*automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

<u>Where *lot lines* do not exist between *townhouse units*, an imaginary line shall be assumed between the*townhouse units* for the purpose of determining *fire separation distance*.</u>

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the*fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from*permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the*lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: Per definitions in Chapter 2, a "lot" is a measured portion of a parcel of land considered as a unit having fixed boundaries, and a "lot line" is a line that bounds a plot of ground described as a lot in the title to a property. For townhouse units that are individually owned, a lot line is the property line that describes the lot in the title to the property, and this lot line would be used for the purposes of determining fire separation distance and fire-resistance rated exterior wall requirements. However, the IRC does not require townhouse units to be individually owned and does not require lot lines, or property lines, between units. In many cases, a townhouse building is owned by one entity and the townhouse units are rented instead of owned. In this case, the lot is the larger parcel of land that the townhouse building is on and there are no lot lines between the units, which results in no exterior wall requirements for exterior walls close to another townhouse unit.

It should be noted that the commentary for Section R302.2, which gives requirements for walls separating townhouses, indicates that the application of this section has its basis in the exterior wall requirements of R302.1 that deal with the building's location on a lot, and goes on to discuss "Where adjacent townhouse dwelling units meet at common or imaginary lot lines...". Based on this it is clear the intent of the code is to assume imaginary lines where common lot lines do not exist, but there is no code requirement for this. To clarify the intent of the code, this proposal adds specific language to require an imaginary line between townhouse units where a lot line does not exist. The result is that the protection from fire between individual units is always provided, regardless of whether a lot line exists or not.

The figures below show the fire hazard this proposal is intended to address. Note that this configuration of townhouse units is from a real project - it is not hypothetical. Figure 1 shows the configuration of townhouse units on a lot where lot lines do not exist between units. Figure 2 shows exterior walls from two units that are perpendicular to each other with garage door openings adjacent to the intersection of these two walls. A fire originating in one garage could easily spread to the next since these large door openings are adjacent to each other (a similar condition occurs between Garage 6 door and Garage 5 window). Note that this condition is completely compliant with exterior wall requirements of the IRC since fire separation distance of these walls is measured to the lot lines of the lot the building is on. Figure 3 shows this same condition with an assumed imaginary line for fire separation distance, which results in a fire-resistance rated wall with no openings at this wall intersection, helping to prevent the spread of fire between units.

Please support this proposal to bring clarity to the intent of the code regarding exterior walls of adjacent townhouse units.

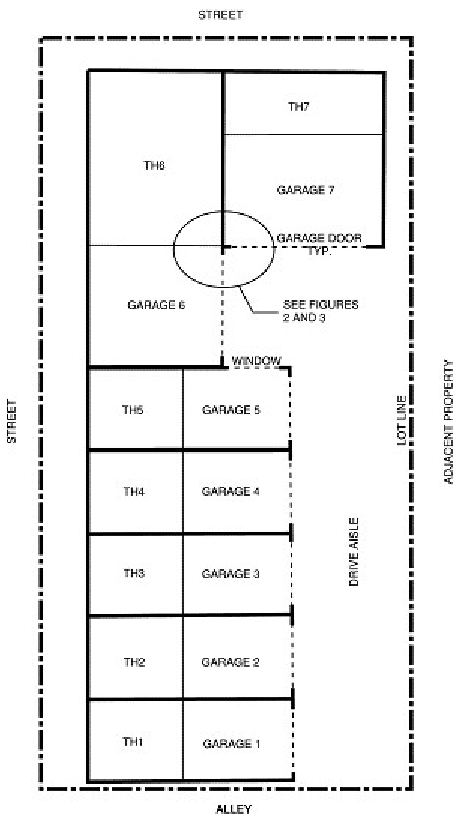


FIGURE 1 - TOWNHOUSE LAYOUT

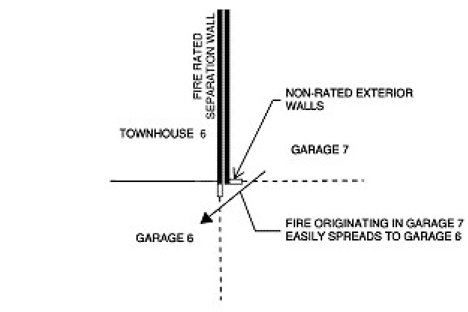


FIGURE 2 - NO IMAGINARY LINE FOR FSD

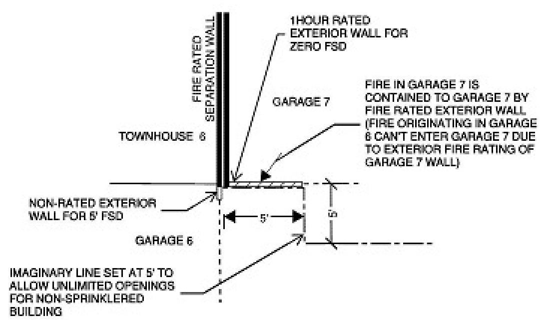


FIGURE 3 - IMAGINARY LINE FOR FSD

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the code is to provide townhouse units with protection from fire in other units and this is typically provided by measuring fire separation distances to lot lines between townhouse units. This proposal applies this intent to townhouse units without lot lines to provide consistent requirements for all townhouse units, which matches common enforcement practices. Since there is not change to the intent of the codes, there should be no change in the cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because the code does not require fire resistance for 90 degree walls - so the concerns raised during the testimony and in the reason statement are not addressed in the proposed text. Not all townhouses have lot lines, so this would add confusion. A common wall between townhouses is not addressed in Section R302.1 - this concern is addressed in the townhouse section with requirements for common walls. There were concerns expressed that there is not a consistent interpretation in the current text on how to address common walls that that are exterior walls on one side. (Vote: 6-5)

Public Comments

Public Comment 1

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

Modify as follows:

2021 International Residential Code

[RB] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior *lot line*.
2. To the centerline of a street, an alley or public way.
3. To an imaginary line between two buildings or *townhouse units* on the *lot*.

The distance shall be measured at a right angle from the face of the wall.

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings* and accessory buildings shall comply with Table R302.1(1); or *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of *exterior walls* shall be measured to the lot line. Where a *lot* ~~lines~~line ~~do~~does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* ~~for the purpose of determinine~~and *fire separation distance* of *exterior walls* shall be measured to the imaginary line. *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating townhouse units that are required by Section R302.2.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Commenter's Reason: The opposition to this proposal raised concerns that walls of townhouse units are addressed in R302.2 so adding townhouse requirements in R302.1 would add confusion or conflict with R302.2. The opposition also stated that this concept may be OK if it only addresses portions of townhouse units that are not connected. We do not agree with these concerns since R302.1 is specific to exterior walls of the townhouse building (i.e., where the units are not connected) and R302.2 is specific to walls separating townhouse units (i.e., where the units are connected). These are two very different types of walls and there is no conflict or confusion created by this proposal - this proposal only addresses portions of the townhouse units that are not connected. However, to address these concerns and avoid any confusion this public comment makes the following modifications to the original proposal:
1. Wording is changed to "fire separation distance of exterior walls" instead of just "fire seperation distance". The intent with this change is to clarify that we are talking about exterior walls only, and not the townhouse separation walls required by R302.2.

2. A sentence is added that specifically states that fire separation distance and the requirements of R302.1 shall NOT apply at walls separating townhouse units that are required by R302.2. This is added to make it very clear that the separation walls are not in any way

regulated by the exterior wall requirements of R302.1.

3. A sentence is added to state that where a lot line exists between adjacent units, fire separation distance of exterior walls is measured to this lot line. This is NOT a change to the code since the definition of fire separation distance already includes measurement to a lot line, and exterior wall requirements are currently enforced based on these lot lines between units. However, since the original proposal only dealt with the condition where a lot line does not exist between units, this sentence is added to clarify what is required where there is a lot line between units. Again, this is not a change to the code, just a clarification.

There was also concern raised by the committee that this proposal doesn't specifically address exterior walls that are perpendicular to each other. We disagree with this concern since this proposal addresses walls that are perpendicular to each other by requiring an imaginary line that fire separation distance for each unit is measured to. Figure 3 in the original proposal clearly shows how this would be applied at perpendicular walls and shows how one wall or the other would have to have a fire-resistance rating for some distance, which would provide protection against the spread of fire from one unit to the next. Note that the imaginary line could also be drawn at a 45-degree angle (or some other angle) which would then require a fire-resistance rating for some distance on both exterior walls.

With the modifications made in this public comment we believe the concerns raised at the committee action hearing have been addressed. This modified proposal will add an important requirement to the code to provide protection against the spread of fire from one townhouse unit to another. This protection will be provided whether there is a lot line or not between the units, which is appropriate since there should be equivalent protection for either case. Please support this proposal 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
The intent of the code is to provide townhouse units with protection from fire in other units and this is typically provided by measuring fire separation distances to lot lines between townhouse units. This proposal applies this intent to the townhouse unites without lot lines to provide consistent requirements for all townhouse units, which matches common enforcement practices. Since there is no change to the intent of the code, there should be no change in the cost of construction.

Final Hearing Results

RB48-22	AMPC1

RB51-22

Original Proposal

IRC: TABLE R302.1(1), TABLE R302.1(2)

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

2021 International Residential Code

Revise as follows:

TABLE R302.1(1) EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.3 of the International Building Code with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[a, b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	NA	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where~~gable~~ vent openings are not installed in the overhang or in any gable end walls that are common to attic areas .

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where~~gable~~ vent openings are not installed in the overhang or in any gable end walls that are common to attic areas .

Reason: The intent of this proposed code change is to address conditions where if there were no vents at the underside of the roof overhang, or in any gable end walls (both of which would allow fire to freely move into attic areas), then there should be no requirement to rate the underside of the overhang. This could be applied to gable, hip, and any other roof style overhangs. Where additional attic ventilation is required to make up for the loss of vents at overhangs where fire-separation distance is an issue in accordance with these tables and footnotes, additional vents could be added at the underside of eaves in other areas of the dwelling where fire-separation distance is not an issue, or at ridge vents.
This proposal change was submitted during the 2019 Group B code cycle but was disapproved. It was disapproved not based on the intent or principle, but on an editorial error to correlate the footnotes for both tables.

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:

TABLE R302.1(1) EXTERIOR WALLS

Portions of table not shown remain unchanged.

For SI: 1 foot = 304.8 mm.
NA = Not Applicable.

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings which communicate with the attic are not installed in the overhang or i~~n any gable end walls that are common to attic areas~~gable wall.

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS WITH FIRE SPRINKLERS

Portions of table not shown remain unchanged.

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings which communicate with the attic are not installed in the overhang or i~~n any gable end walls that are common to attic areas~~gable wall .

Committee Reason: The modification was to clarify that which walls are intended to be addressed in the proposal. The code change as a whole addresses gable walls where there is not connection to the attics - so this change does clarify the intent of the footnotes. (Vote: 10-0)

Final Hearing Results

RB51-22	AM

RB54-22

Original Proposal

IRC: R302.2.2

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

2021 International Residential Code

Revise as follows:

R302.2.2 Common walls.
Common walls separating *townhouse units*shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without openings, plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where ~~c~~an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.

Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

Reason: This code change is a necessary clarification in the IRC that unlike the IBC the IRC does not intend for openings such as doors to be located within common walls. The section being modified restricts penetrations in the common wall and limits what can be placed within the common wall. It therefore stands to reason that the IRC should also address openings that are not explicitly prohibited. A common wall is treated like an exterior wall located at a zero fire separation distance.
Unlike the IRC, the IBC does not address townhouses and requires that dwelling units and sleeping units be separated with fire partitions since the dwelling units are no considered attached single family dwellings like Townhouses in the IRC. As a result the IBC requires in Section 708.6 and TABLE 716.1(2) that openings in fire partitions separating dwelling or sleeping units units be protected for 1/3 or 3/4 hour opening protectives.

The IRC does not require protected openings and restricts the location of openings and in the case of protection based on fire separation distance limits opening size through % of wall are limits.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change is a clarification and reflects current regulatory practice.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because not having an opening the common wall is common sense application of the code. (Vote: 10-0)

Final Hearing Results

RB54-22	AS

RB58-22

Original Proposal

IRC: R302.2.4

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

2021 International Residential Code

Revise as follows:

R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for*townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

    Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof decking or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^5/_8$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.<u>Openings shall not be permitted in the wall.</u>

Reason: The code change is necessary to address a significant omission in the IRC that predates the 2005 edition where exterior wall openings located in common walls extending above a lower roof in a stepped Townhouse are neither prohibited nor required to be protected. While the common wall is not a party-wall that is regulated in the IBC as a fire wall, common walls are protected similar to exterio walls located at zero fire separation distance; Section R302.2.2 does not permit openings in the common wall and restricts penetrations. Additionally, communicating openings are not permitted between dwelling units it would seem reasonable to prohibit exterior wall openings in exterior portions of the common wall.

The proposed code change takes an approach to solving the problem caused by the regulatory omission that is consistent with Table R302.1(1) and R302.1(2) where the IRC does not require fire protection for exterior wall openings but accomplishes the desired level of protection either prohibiting exterior wall openings or restricting their area. Additionally, the proposed code change is also consistent in the way that the IBC regulates party walls. Since the FSD at a common wall is zero the proposed code change takes the simplest solution to prevent fire from the dwelling unit below from reaching the dwelling unit above by prohibiting the exterior wall opening. This is consistent with approach R202.2.3 and R302.3.4 and it's sub parts.

The attached figures 1 and 2 attempt to illustrate the issue. Figure one shows a plan view of the third story and roof and figure 2 shows a building section depicting the elevation difference. The common wall is depicted in the dotted blue line.Proponent feels that the code change to be editorial and to add clarity for consistent and uniform code application.

Figure 1

Figure 1

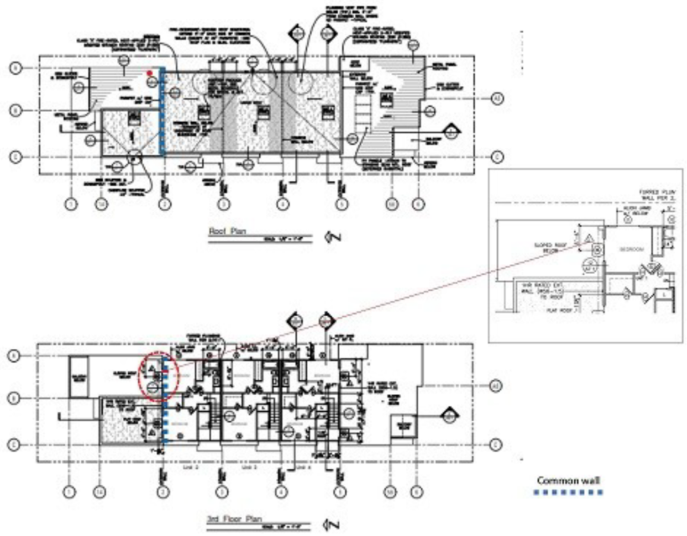
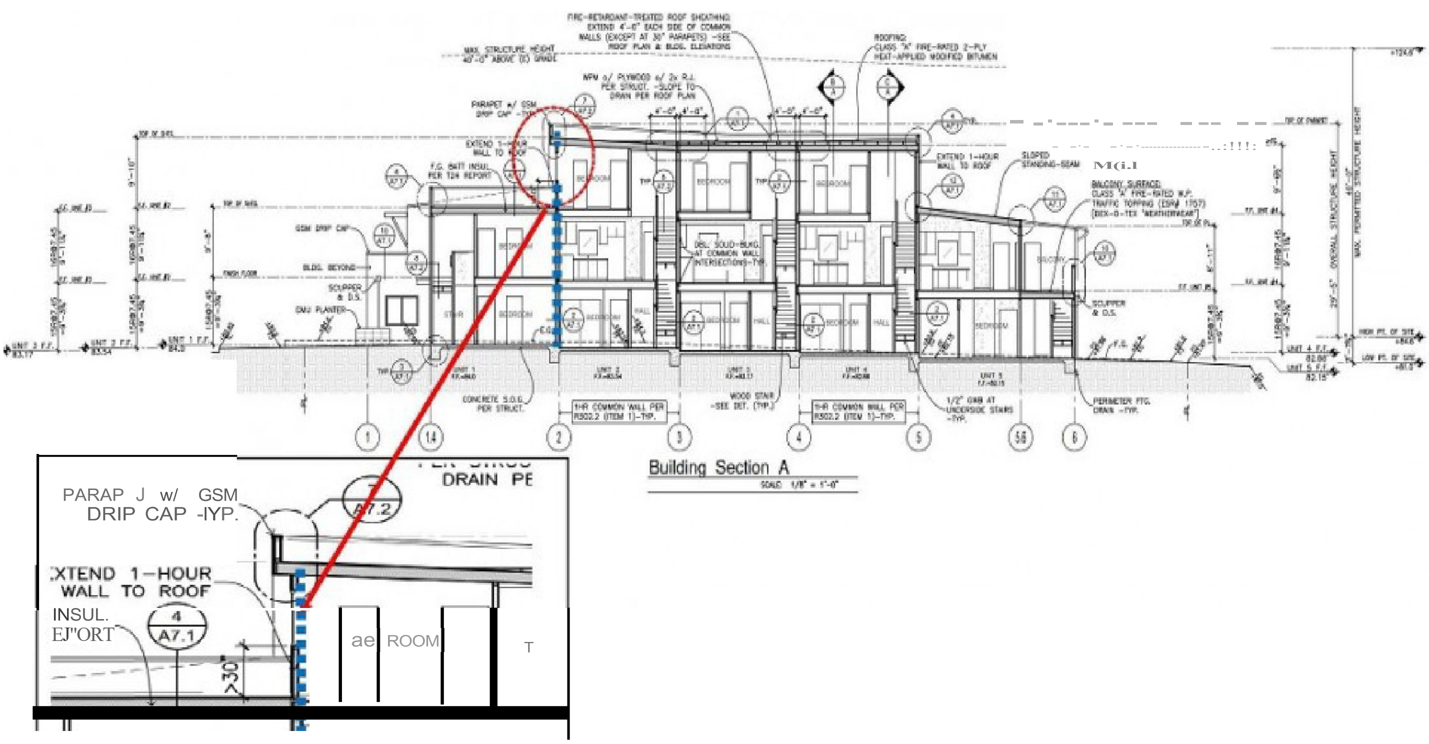
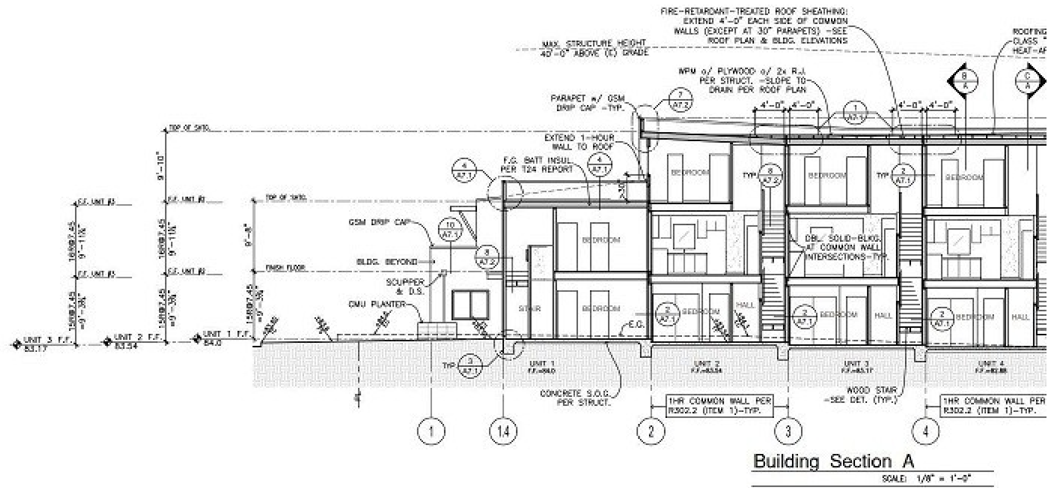


Figure 2





Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is editorial however it may be considered to increase the cost of construction in jurisdictions that previously considered the regulatory omission to be justification to permit exterior wall openings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides clarification on the intent of the code for common/exterior walls where the 1 hour rating is required. This option was preferred to RB59-22. (Vote: 10-0)

Final Hearing Results

RB58-22	AS

RB61-22

Original Proposal

IRC: R302.3, R302.3.1 (New), R302.3.2 (New), R302.2.1

Proponents: Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies ~~having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2of the International Building Code~~ constructed in accordance with Section R302.3.1 through R302.3.3. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

~~**Exceptions:**~~

1. ~~A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.~~
2. ~~Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.~~

Add new text as follows:

R302.3.1 Separation. *Dwelling units* in two-family *dwellings* shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E 119, UL 263 or Section 703.3 of the *International Building Code.*

Exception: A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

R302.3.2 Continuity. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the *exterior wall*, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exception: Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than 5/8-inch (15.9 mm) Type-X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

Revise as follows:

R302.3.3 ~~**R302.2.1**~~ **Supporting construction.** Where floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies shall have an equal or greater fire-resistance rating.

Reason: The intent of this change is to pull out the construction requirement of the common wall as a subsection to align with proper code location. There is already a construction subsection in R302.3.1 and this just creates another subsection that discusses the construction of the common wall. All three subsections are not new language to the code but rather a reorganization.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact to this proposal because the language did not change. This is just a reorganization to create better readability.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R302.3.1 Separation. *Dwelling units* in two-family *dwellings* shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E 119, UL 263 or Section ~~703.3~~ 703.2.2 of the *International Building Code*.
Exception: A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

Committee Reason: The modification was a correction in the referenced section. This proposal is reorganization of the current requirements that adds clarity. There were concerns that Section R302.3.2 would disallow platform construction. (Vote: 7-3)

Public Comments

Public Comment 1

Proponents: Jason Smart, American Wood Council (jsmart@awc.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

R302.3.2 Continuity. Vertical and horizontal assemblies separating dwelling units shall be constructed in a manner that provides continuity of the fire-resistance rating between the dwelling units. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the *exterior wall*, and wall assemblies shall extend from the foundation to the underside of the roof sheathing~~.

> **Exception**: Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than 5/8-inch (15.9 mm) Type-X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

Commenter's Reason: These modifications further clarify that the intent is to require continuity of the required fire-resistance rating of the horizontal or vertical assembly. This is consistent with the changes made to address platform construction under FS19-21.

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 RB61-22 is neutral, and the modification presented in this public comment simply clarifies the intent of the section on continuity. This modification is intended to use terminology that works with platform construction, where horizontal assemblies support walls above, and are supported by walls of the story below.

Final Hearing Results

RB61-22	AMPC1

RB63-22

Original Proposal

IRC: R302.3, R302.3.1, R302.3.2 (New), R302.3.3 (New), R302.3.3.1 (New), R302.3.3.2 (New), R302.3.5 (New)

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Delete and substitute as follows:

~~**R302.3 Two-family dwellings.** *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

~~**Exceptions:**~~

1. ~~A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.~~
2. ~~Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.~~

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other in accordance with Sections 302.3.1 through 302.3.5, regardless of whether a *lot line* exists between two *dwelling units.*

Add new text as follows:

R302.3.1 Dwelling unit separation. The two dwelling units shall be separated by fire-resistance rated assemblies that are vertical, horizontal, or a combination thereof.

R302.3.2 Fire-resistance rating. Vertical and horizontal assemblies separating dwelling units shall have a fire-resistance rating of 1-hour, or a fire-resistance rating of 1/2 hour in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904. Fire-resistance ratings shall be based on testing in accordance with ASTM E119 or UL 263, or an analytical method in accordance with Section 703.2.2 of the International Building Code.

R302.3.3 Continuity. Vertical and horizontal assemblies separating dwelling units shall be constructed in a manner that provides a continuous and complete separation between the dwelling units.

R302.3.3.1 Horizontal assemblies. Horizontal assemblies separating dwelling units shall extend to and be tight against exterior walls or vertical separation assemblies complying with Section 302.3.2.

R302.3.3.2 Vertical assemblies. Vertical assemblies separating dwelling units shall extend to and be tight against any combination of the following:

1. The foundation.
2. A horizontal assembly complying with Section 302.3.2

3. The underside of roof sheathing.
4. The ceiling beneath an uninhabitable attic, provided that the ceiling is constructed using not less than 5/8-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the vertical assembly terminating at the ceiling, and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

Revise as follows:

R302.3.4 **~~R302.3.1~~** **Supporting construction.** ~~Where floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies have~~ Vertical and horizontal assemblies separating dwelling units shall be supported by construction having an equal or greater fire-resistance rating.

Add new text as follows:

R302.3.5 Vertically stacked dwelling units. Where one dwelling unit in a two-family dwelling is located above the other and an automatic sprinkler system complying with Section P2904 is not provided in both dwelling units, both of the following shall apply:

1. Horizontal and vertical assemblies separating the dwelling units, including an interior stairway serving as the means of egress for the upper dwelling unit, shall be constructed in a manner that limits the transfer of smoke.
2. A notification appliance connected to smoke alarms in the other dwelling unit shall be provided in each dwelling unit.

Reason: This proposal accomplishes two things. First, it provides a cleanup and update of Section R302.3, including moving the exceptions to the main code text. Provisions have been reorganized and divided into subsections to more clearly delineate current requirements, and the section has been broadened to recognize that separations between dwelling units might not be limited to either a floor assembly or a wall assembly. The current text restricts horizontal assemblies to only include floors, as opposed to floor-ceiling or ceiling-only assemblies, and it fails to clearly recognize and accommodate that separations may involve a combination of vertical and horizontal elements, which always occurs if an interior stairway is used as the means of egress for the upper unit. Terminology in IBC Section 707.3.10 has been used as guidance for the proposed IRC text.
Second, Section 302.3.5 has been added to recognize that stacked duplexes are inherently more hazardous than side-by-side duplexes, particularly with respect to the upper unit due to the tendency of smoke and flames to spread vertically, which increases the risk of charging the upper unit with smoke and cutting off the means of egress and the means of escape if/when fire vents through exterior doors or windows. Providing a smoke separation, in addition to the current requirement for a fire-rated separation, will delay smoke transmission to the upper unit. The proposed text related to construction of the smoke separation is derived from the IBC definition of "smoke partition," which establishes the performance requirement "...is constructed to limit the transfer of smoke."

Providing a remote sounder for the opposite dwelling unit will allow more escape time for occupants who are not in the unit of origin, recognizing that smoke alarms are designed to provide sufficient warning to escape an incipient fire but not necessarily a well-developed fire spreading from another part of the building. Additional warning is particularly important where: 1) The downstairs unit occupants are not home or are home but don't or are unable to warn the upstairs occupants, and 2) The upstairs unit is two stories tall, perhaps even with a habitable attic above, which increases escape distance and the associated escape time, particularly for individuals who may have difficulty rapidly traversing stairs or using a means of escape window that would be 3 or 4 stories above grade.

For disclosure, I am a consultant to NFSA, but this proposal is not submitted on NFSA's behalf and was not provided to NFSA prior to submittal. It is submitted as a personal proposal based on my personal interest in this topic.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Technically, the IRC requires all buildings to be sprinklered, so this doesn't have a cost impact with respect to the model code. However, in jurisdictions that choose to amend the IRC by removing the sprinkler requirement, there would be a cost. Alternately, the increased flexibility provided for using additional types of separation assemblies and a combination of vertical and horizontal assemblies may provide a reduction in the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal addresses the continuity of horizontal and vertical separation for vertically stacked units. This is not addressed in the current text. This provides flexibility in design options. This would also address current housing needs that involves separating existing housing into two units. (Vote: 7-3)

Public Comments

Public Comment 3

Proponents: Jason Smart, American Wood Council (jsmart@awc.org); David Tyree, American Wood Council, American Wood Council (dtyree@awc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R302.3.3 Continuity. Vertical and horizontal assemblies separating dwelling units shall be constructed in a manner that providescontinuity of the fire-resistance rating ~~a continuous and complete separation~~ between the dwelling units.

Commenter's Reason: This modification further clarifies that the intent is to require continuity of the required fire-resistance rating of the horizontal or vertical assembly. This is consistent with the changes made to address platform construction under FS19-21.

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 RB63-22 is neutral, and the modification presented in this public comment simply clarifies the intent of the section on continuity. This modification is intended to use terminology that works with platform construction, where horizontal assemblies support walls above, and are supported by walls of the story below.

Final Hearing Results

RB63-22	AMPC3

RB64-22

Original Proposal

IRC: R302.3.2 (New), TABLE R302.3.2 (New), R302.3.2.1 (New), R302.3.2.2 (New), R302.3.2.3 (New)

Proponents: Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Add new text as follows:

R302.3.2 Common accessory rooms. A common accessory room shall be separated as required by Table R302.3.2. Openings in a common accessory room shall comply with Section R302.3.2.1. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.3 shall not apply to common accessory room walls that are perpendicular to the adjacent dwelling unit wall.

TABLE R302.3.2 DWELLING-COMMON ACCESSORY ROOM SEPARATION

SEPARATION	MATERIAL
From the dwelling units and attics	Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall
From habitable rooms above or below the common accessory room	Not less than 5/8-inch Type X gypsum board or equivalent
Structures supporting floor/ceiling and wall assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent
Common accessory rooms located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch=25.4 m, 1 foot=304.8 mm

R302.3.2.1 Opening protection. Openings from a common accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared common accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

R302.3.2.2 Duct penetration. Ducts penetrating the walls or ceilings separating the *dwelling* from the common accessory room shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material and shall not have openings into the common accessory room.

R302.3.2.3 Other penetrations. Penetrations through the walls, ceiling, and floor level separation required in Section R302.3.2 shall be protected as required by Section R302.11, Item 4.

Reason: Designers are beginning to incorporate optional design common accessory rooms such as common laundry facilities and storage rooms that are connected to both dwelling units in their design. The IRC is currently silent on such a room but due to potential storage hazards as well as gas appliances of the washer/dryers and other appliances, there is a need to provide clear directions to protect the dwelling units from a shared common accessory space. The proposal is to treat these common rooms similar to garages and therefore, much of the proposed language draws from the dwelling-garage provision of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Since this is just a clarifying addition where the code is silent, several jurisdictions have already required the construction of the separation wall between habitable space and their accessory spaces. Therefore no increase in cost is noted.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal addressed shared spaces in duplexes (e.g., bike storage, laundry facilities) where the code is currently silent. The proposal provides appropriate separation requirements. (Vote: 9-1)

Public Comments

Public Comment 1

Proponents: Jenifer Gilliland, Seattle Department of Construction and Inspections, Washington Association of Building Officials (jenifer.gilliland@seattle.gov); Richard Donald Pellinger, Seattle Dept of Const and Inspections, Washington Association of Building Officials (richard.pellinger@seattle.gov); Micah Chappell, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R302.3.2 ~~Common~~ Shared accessory rooms. ~~A common~~ Shared accessory ~~room~~ rooms shall be separated from each individual dwelling unit ~~as required by~~ in accordance with Table R302.3.2. Openings ~~in a common~~ between the shared accessory room and dwelling unit shall comply with Section R302.3.2.1. Attachment of gypsum board shall comply with Table R702.3.5. ~~The wall separation provisions of Table R302.3 shall not apply to common accessory room walls that are perpendicular to the adjacent dwelling unit wall.~~

TABLE R302.3.2 DWELLING-~~COMMON~~SHARED ACCESSORY ROOM SEPARATION

SEPARATION	MATERIAL
From the dwelling units and attics	Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall
From habitable rooms above or below the~~common~~ shared accessory room	Not less than 5/8-inch Type X gypsum board or equivalent
Structures supporting floor/ceiling and wall assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent
Common accessory rooms located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch=25.4 m, 1 foot=304.8 mm

R302.3.2.1 Opening protection. Openings from a ~~common~~ shared accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared ~~common~~ accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

R302.3.2.2 Duct penetration. Ducts penetrating the walls or ceilings separating the *dwelling* from the ~~common~~ shared accessory room shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material and shall not have openings into the ~~common~~shared accessory room.

R302.3.2.3 Other penetrations. Penetrations through the walls, ceiling, and floor level separation required in Section R302.3.2 shall be protected as required by Section R302.11, Item 4.

Commenter's Reason: This PC is being submitted by the proponents of the original code proposal and refines the original proposal by:

- Replacing the word “common” throughout the proposal with an easily understood, plain language substitute, “shared".
- Adding language to clarify that the shared accessory room must be separated from each individual dwelling unit that shares the room.
- Eliminating the last sentence of the proposed R303.3.2 because it isn’t needed and is confusing.
- Eliminating "and wall" in the fourth row of the table as it duplicates the requirement in the second row of the table for separation from the dwelling units and attics.
- Eliminating the last row of TABLE R302.3.2 because the information, originally taken from the garage separation provisions, isn’t relevant in this situation where the shared accessory room is between the two units which are themselves within the two-family dwelling.

Designers are beginning to incorporate shared accessory rooms such as laundry facilities and storage rooms that are connected to both dwelling units in their design for two-family dwellings. The IRC is currently silent on such rooms, but due to potential storage hazards and the fossil fuel supplied to washer/dryers and other appliances, clear direction is needed to protect the dwelling units from a shared accessory space. The proposal treats these shared rooms in the same way that the separation of shared garages from dwelling units is handled in the code. As a result, much of the proposed language draws from the dwelling-garage provisions of the code.

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 would make it clearer how to protect these shared accessory rooms between units in a two-family dwelling. Right now, the topic is unaddressed by the code which means jurisdictions may be under- or over-regulating them. So, depending on the jurisdiction this could be an increase or decrease in cost.

Public Comment 2

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

Modify as follows:

2021 International Residential Code

R302.3.6 **~~R302.3.2~~ Common accessory rooms.** A common accessory room shall be separated as required by Table~~R302.3.2~~ R302.3.6. Openings in a common accessory room shall comply with Section ~~R302.3.2.1~~ R302.3.6.1. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table ~~R302.3.2~~ R302.3.6 shall not apply to common accessory room walls that are perpendicular to the adjacent dwelling unit wall.

TABLE R302.3.6 ~~R302.3.2~~ DWELLING-COMMON ACCESSORY ROOM SEPARATION

SEPARATION	MATERIAL
From the dwelling units and attics	Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall
From habitable rooms above or below the common accessory room	Not less than 5/8-inch Type X gypsum board or equivalent
Structures supporting floor/ceiling and wall assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent
Common accessory rooms located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch=25.4 m, 1 foot=304.8 mm

R302.3.6.1 **~~R302.3.2.1~~ Opening protection.** Openings from a common accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared common accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

R302.3.6.2 **~~R302.3.2.2~~ Duct penetration.** Ducts penetrating the walls or ceilings separating the *dwelling* from the common accessory room shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other *approved* material and shall not have openings into the common accessory room.

R302.3.6.3 **~~R302.3.2.3~~** **Other penetrations.** Penetrations through the walls, ceiling, and floor level separation required in Section ~~R302.3.2~~ R302.3.6 shall be protected as required by Section R302.11, Item 4.

Commenter's Reason: Editorial clarification of how this section is best integrated into the rewrite accomplished by RB63-22.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction editorial

Final Hearing Results

RB64-22	AMPC1,2

RB71-22

Original Proposal

IRC: TABLE R302.6

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R302.6 DWELLING-GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attics	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the garage side
From *living space* ~~habitable rooms~~ above the garage	Not less than $^{5}/_{8}$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^{1}/_{2}$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Reason: Habitable space is a defined term that specifically does not apply to bathrooms or storage rooms. This is a critical part of the definition so that code provisions related specifically to habitable space won't unnecessarily apply to rooms not typically inhabited for long periods, like bathrooms and storage rooms. However, this section is about protecting the dwelling from the fire hazard of the garage and that does not seem like a concern specific to "habitable space". If a bedroom connected to the remaining dwelling unit was over the garage, is there really a greater fire hazard than if the bathroom off the bedroom is the only thing over the garage? There may be no door between the two, as is common in master bedrooms. Use of the defined term "living space" will include rooms like a laundry room or bathroom when located over the garage. A storage room over the garage would still not be affected by this proposal. If others believe it should, please consider a public comment modification at that time.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction when bathrooms or laundry rooms are built over a garage but no other habitable rooms are. The cost increase will depend on how large these spaces are and which walls are supporting the floor/ceiling separation, as they will require 5/8" type X gypsum board instead of 1/2".

The following prices were found online at a major home improvement retailer in Colorado. A standard 1/2" 4x8 sheet of gypsum board is listed at $13.94. A 5/8" 4x8 type X sheet is listed at $16.23. This is an approximately 16% increase in material costs. Assuming upwards of a 500 square foot master bathroom and laundry room, this would be approximately 16 to 17 sheets for the ceiling. If this area was 20 x 25 with the 20 foot length down two outside walls of the garage approximately 10 feet tall, this would be another 400 square feet and approximately 14 more sheets. This wall protection is required to support the horizontal assembly. If 32 sheets total were estimated at an increase of $2.29 per sheet the cost increase for materials is approximately $73.28 There would likely be a minimal increase in the labor costs for installing the heavier sheets. Total cost increase for a very large example should be under $500 conservatively. However, I welcome any better cost analysis from professional cost estimators.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE R302.6 DWELLING-GARAGE SEPARATION

SEPARATION	MATERIAL

SEPARATION	MATERIAL
From the residence and attics	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the garage side
From ~~living space~~ portions of the *dwelling unit* above the garage	Not less than $^{5}/_{8}$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^{1}/_{2}$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Committee Reason: The modification is an improvement over the original proposal. The modification would require not only bedrooms or family rooms over a garage to be separated, but also connected spaces such as closets or bathrooms that are part of dwelling portion of the structure. This will improve life safety. (Vote: 10-0)

Final Hearing Results

RB71-22 AM

RB73-22

Original Proposal

IRC: R302.10.4, R302.10.5

Proponents: Tim Earl, GBH International, Self (tearl@gbhint.com)

2021 International Residential Code

Revise as follows:

R302.10.4 Exposed attic insulation. Exposed insulation materials installed on attic floors shall have a critical radiant flux of not less than 0.12 watt per square centimeter when tested in accordance with ASTM E970.

Delete without substitution:

~~**R302.10.5 Testing.** Tests for critical radiant flux shall be made in accordance with ASTM E970~~.

Reason: Editorial cleanup. There is no reason to have a separate paragraph to tell readers which test applies to the preceding paragraph.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This is an editorial combination of two sections dealing with the same topic. (Vote: 10-0)

Final Hearing Results

RB73-22	AS

RB75-22

Original Proposal

IRC: R302.13

Proponents: Raymond Steadward Jr, Town Of Enfield CT, Town Of Enfield CT (rsteadward@enfield.org)

2021 International Residential Code

Revise as follows:

R302.13 Fire protection of floors. Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a $^1/_2$-inch (12.7 mm) gypsum wallboard membrane, $^5/_8$-inch (16 mm) *wood structural panel* membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, or other *approved* equivalent sprinkler system.
2. Floor assemblies located directly over a *crawl space* not intended for storage or for the installation of fuel-fired or electric-powered heating *appliances*.
3. Portions of floor assemblies shall be permitted to be unprotected where complying with the following:
   3.1. The aggregate area of the unprotected portions does not exceed 80 square feet (7.4 m^2) per story.
   3.2. Fireblocking in accordance with Section R302.11.1 is installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or *structural composite lumber* equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other *approved* floor assemblies demonstrating equivalent fire performance.
5. <u>Wood floor assemblies less than 600 square feet (55.7 m^2) within detached accessory structures with no habitable space above them.</u>

Reason: Small haylofts or other small/ low/ limited occupancy or risk floor systems should not have to be held to the same standards as a dwelling unit because the likely-hood of an egress issue or the need for entrance to rescue or for fire suppression is so small in non-habitable spaces and structures. This will also close a small gap for "on-grade" prefab type structures that may not exempted by Exemption #2

Cost Impact: The code change proposal will decrease the cost of construction
This will lower the cost of construction for some small accessory structures.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because this is a reasonable option for small detached accessory structures. There were questions about the justification for the 600 sq.ft. area limitations. (Vote: 7-3)

Final Hearing Results

RB75-22	AS

RB76-22

Original Proposal

IRC: R303.1, R303.1.1 (New), R303.1.2 (New), R303.2, R303.9, R303.9.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R303.1 Habitable rooms. *Habitable* *space* ~~rooms~~ shall be provided natural light and natural ventilation in accordance with Sections R303.1.1 through R303.1.3. ~~have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural*ventilation* shall be through windows, skylights, doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The openable area to the outdoors shall be not less than 4 percent of the floor area being ventilated.~~

Exceptions:

1. ~~For habitable rooms other than kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical *ventilation* system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.~~
2. ~~For kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a local exhaust system is installed in accordance with Section M1505.~~
3. ~~The glazed areas need not be installed in rooms where Exception 1 is satisfied and artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.~~
4. ~~Use of *sunroom* and patio covers, as defined in Section R202, shall be permitted for natural*ventilation* if in excess of 40 percent of the exterior *sunroom* walls are open, or are enclosed only by insect screening~~.

Add new text as follows:

R303.1.1 Natural light. Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall open directly onto a street, alley or *public way*, or a *yard* or *court* located on the same *lot* as the *building.*

Exceptions:

1. Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley,*public way*, *yard* or *court*, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).
2. Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.
3. Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
4. Eave projections shall not be considered as obstructing the clear open space of a yard or court.

R303.1.2 Natural ventilation. Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

Exceptions:

1. Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.
2. Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.
3. Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.
4. Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m^2). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

Revise as follows:

~~**R303.2**~~ **R303.1.3 Adjoining rooms.** For the purpose of determining light and *ventilation* requirements, rooms shall be considered to be a portion of an adjoining room where not less than one-half of the area of the common wall is open and unobstructed and provides an opening of not less than one-tenth of the floor area of the interior room and not less than 25 square feet (2.3 m^2).

~~**Exception:** Openings required for light or *ventilation* shall be permitted to open into a *sunroom* with thermal isolation or a patio cover, provided that there is an openable area between the adjoining room and the *sunroom* or patio cover of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m²). The minimum openable area to the outdoors shall be based on the total floor area being ventilated.~~

Delete without substitution:

~~**R303.9 Required glazed openings.** Required glazed openings shall open directly onto a street or public alley, or a *yard* or court located on the same *lot* as the building.~~

~~**Exceptions:**~~

1. ~~Required glazed openings that face into a roofed porch where the porch abuts a street, *yard* or court and the longer side of the porch is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).~~
2. ~~Eave projections shall not be considered as obstructing the clear open space of a *yard* or court.~~
3. ~~Required glazed openings that face into the area under a deck, balcony, bay or floor cantilever where a clear vertical space not less than 36 inches (914 mm) in height is provided.~~

~~**R303.9.1 Sunroom additions.** Required glazed openings shall be permitted to open into *sunroom additions* or patio covers that abut a street, *yard* or court if in excess of 40 percent of the exterior *sunroom* walls are open, or are enclosed only by insect screening, and the ceiling height of the *sunroom* is not less than 7 feet (2134 mm).~~

Reason: In the 1800's natural light and ventilation were married in the only feature to provide them, windows. Today, the IRC offers other ways to provide light and ventilation that are no longer the same feature, yet they are still married together in Section R303.1. It's time for the IRC to modernize and allow light and ventilation to be separately addressed. Currently, the provisions and choices for light and ventilation are incredibly difficult to understand and scattered throughout sections that have been modified in pieces since the 2000 edition. Nothing reveals just how confusion these provisions are presented than when you are trying to teach them to new professionals.
Very little has been removed or changed in the application of these provisions, but you have to carefully look them over to realize this. The majority of the deletions have simply been moved and reworded. They have been applied to what they are meant to apply to, light, ventilation, or both.

SOME MOTIVATION FOR THIS PROPOSAL.

1) Glazed openings are required in Section R301.1. However, you have to skip ahead to R301.9 to get the full story of what they face into.

2) Ventilation can be provided through windows, skylights, doors and louvers, yet there is language like "the glazed area need not be openable". This would not need to be said if glazed openings and ventilation openings were looked at individually.

3) "Roofed porches" (R303.9) have different requirements for obstructed perimeters than "patio covers" (R303.1). I am unable to find anyway to interrupt these two features distinctly using the IRC. These terms are similar jargon.

4) Sunroom provisions are just plain confusing. There is no reason to site a definition, such as "as defined in Section R202". That is not standard form.

COMMENTARY EXPLAINING THE INTENT OF EACH MODIFICATION [WRITTEN AS IF APPROVED]

R303.1 Habitable rooms: Habitable space shall be provided natural light and natural ventilation in accordance with Sections R303.1.1 through R303.1.3.

This purposefully begins with the defined term "habitable space" which connects the entire section and use of the term "habitable rooms" back to the definition of habitable space. This sets the general requirement that they shall have light and ventilation.

R303.1.1 Natural light: Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall open directly onto a street, alley or public way, or a yard or court located on the same lot as the building.

This allows the methods for natural light to be presented independently of them being an option for ventilation as well. "habitable room" is now used when referencing measurements of floor area, speaking to the presence of dividing walls that create "rooms" and affect where natural light will reach.

R303.1.1, Exception 1: Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, public way, yard or court, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).

[relocated from R303.9 Ex. 1] This clarifies when the glazed openings face into an area covered with a roof. All jargon terms for the floor have been included as to not confuse interpretation (porch, deck, patio). This exception is from R303.9 which is specific to "glazed openings" not ventilation.

R303.1.1, Exception 2: Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.

By definition, sunrooms have 40% of their wall and ceiling area in glazed openings. Sunrooms are sunny inside. Section R303.9.1 Sunroom additions is a subsection to "required glazed openings". These provisions appear to be about natural light. A sunroom that needs to bring light in to the room it adjoins need not be open to the outside air (ventilation). Glazed openings can open into sunrooms.

R303.1.1, Exception 3: Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

[relocated from R303.1, ex 3] The original exception is rewritten simply in reference to glazed openings for natural light. It no longer must address the other exception about ventilation.

R303.1.1, Exception 4: Eave projections shall not be considered as obstructing the clear open space of a yard or court.

[relocated from R303.9, exception 2] Text unchanged.

R303.1.2 Natural ventilation: Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

This language from R303.1 related to ventilation has been relocated to it's own section. Text is unchanged.

R303.1.2, Exception 1: Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.

[relocated from R303.1, ex. 1] The original text is relocated as an exception only to ventilation, so the reference to "glazed areas need not be openable" is deleted.

R303.1.2, Exception 2: Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.

[relocated from R303.1, ex. 2] The original text is relocated as an exception only to ventilation, so the reference to "glazed areas need not be openable" is deleted.

R303.1.2, Exception 3: Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.

[intent relocated from R303.1, ex 4 and 303.9.1] This change will require more explanation. This exception is for "exterior floor areas covered in a roof and partially enclosed with walls" and addresses how enclosed the walls are and if ventilation can get through. This is why the location of the openings in the walls are not important, as they are in the "roof porch exception for light to hit the windows under the natural lighting provisions". This is why thermally isolated sunrooms and roofed porch, deck, or patio is referenced. Often these floor areas will be larger than the portion that is covered. Therefore the proposed exception refers to the "roofed area perimeter". Using the term "area" is in lieu of repeating all the jargon terms.

R303.1.2 Exception 4: Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m2). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

[relocated from R303.2] Though this exception is about an adjoining space, it is better suited in the exceptions for ventilation. A sun room has 40% glazing, so it's sunny glazed openings can open into any of them under proposed R303.1.1, ex 2. A thermally isolated sunroom according to the categories in R301.2.1.1.1 is always nonhabitable. Therefore the sunroom does not require ventilation. The goal of this exception is for fully enclosed sunrooms and how much openable area is required to pass through the sunroom and reach the adjoining habitable space. The original motivation for this exception is related to sunroom additions and not requiring relocation of windows for ventilation. Thus the provisions for a large opening between the two that occupants can open to "connect" the air of the sunroom and adjoining room. Though the sunroom is not "required" to be ventilated, the air does not know this and the sunroom is ventilated regardless. Therefore the minimum openable area of the sunroom walls must account for 4% percent of the floor area for the sunroom and the adjoining room combined.

DELETIONS THAT WERE NOT REWRITTEN.

Exception 3 of R303.9 is unnecessary. 303.9 is about glazed openings which is about natural light reaching the opening. It makes no sense to expect a window under a deck of unlimited size and unlimited percent of perimeter enclosed to the ground would provide natural light to a window. For a glazed opening under a "roofed porch" to get sunlight, the ceiling must be seven feet high and open around 65% of the perimeter. This does NOT equate to burying a glazed opening under a deck. This exception appears to be included due to emergency escape and rescue opening provisions, which is unnecessary and confusing. This has been deleted.

Mentions of "insect screening" has been deleted. There is no mention of screens on windows, a common practice and requirement of the IPMC. Any reasonable interpretation of ventilation should not be affected by screens.

A FEW MORE NOTES:

All mentions of glazed openings toward obstructions have been worded as "facing into". The term "glazed openings" is a noun. When used in a sentence as "Required glazed openings shall be permitted to OPEN into a..." the term "open" is read more as a verb, an action and appears to be about ventilation. Therefore all glazed opening provisions are written as "facing into"

All mention of ventilation opens are phrased "open into" to further assist in interpretation.

The goal of this proposal is for the provisions to make logical sense, to be specific in language, and to most effectively "Present the Intent"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial in nature and does not change the original intent in any manner that creates a substantial cost impact in either direction. Readers will save money on headache medicine from not reading these sections as is ever again.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R303.1.1 Natural light. Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall face ~~open~~ directly onto a street, alley or *public way*, or a *yard* or *court* located on the same *lot* as the *building.*
Exceptions:

1. Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, *public way*, *yard* or *court*, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).
2. Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.
3. Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
4. Eave projections shall not be considered as obstructing the clear open space of a yard or court.

Committee Reason: The modification to Section R301.1.1 was for consistent terminology for glazed openings throughout this proposal. The proposal was approved as modified as it separates the requirements for natural light and ventilation. There were concerns the Section R303.1.1 Exception 4 does appear to be an exception. (Vote: 10-0)

Final Hearing Results

RB76-22 AM

RB82-22

Original Proposal

IRC: R305.1.2 (New), AJ109.7

Proponents: Ardel Jala, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (micah.chappell@seattle.gov)

2021 International Residential Code

R305.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).
2. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
3. Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.
4. Beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width shall project not more than 78 inches (1981 mm) from the finished floor.

R305.1.1 Basements. Portions of *basements* that do not contain *habitable space* or hallways shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).

Exception: At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

Add new text as follows:

R305.1.2 Habitable attics and basements in existing buildings. Where a *change of occupancy* creates a *habitable attic* or *habitable* space in a *basement*, ceiling height shall not be less than 6 foot 8 inches (2032 mm

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 6 feet 8 inches (2134 mm).
2. At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

Delete without substitution:

~~**AJ109.7 Ceiling height.** *Habitable spaces* created in existing *basements* shall have ceiling heights of not less than 6 feet, 8 inches (2032 mm), except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the *basement* floor. Existing finished ceiling heights in nonhabitable spaces in *basements* shall not be reduced.~~

Reason: This is one of (4) proposals that pulls existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety. This proposal deletes the provision for ceiling height in existing buildings from Appendix J section AJ109.7 and moves it into the ceiling height provisions of section R305. This proposal permits a lower ceiling height in basements and habitable attics in existing buildings.

Historic minimum ceiling heights varied across the legacy codes over time. For example, the Uniform Building codes prior to 1979 permitted habitable space ceiling height as low as 6 foot 4 inches. The 1979 Uniform Building Code established minimum ceiling heights of 7 feet 6 inches in habitable spaces and 7 feet in other spaces. This was the UBC standard until the 1997 Uniform Building Code which adopted 7 feet as the minimum ceiling height. Habitable spaces under current code must maintain 7 feet minimum ceiling height per section R305.1. Homeowners regularly convert unfinished attics and basements into habitable space as a way to maximize the usable square footage in their existing home. Though the space may have been established with a legal ceiling height per a legacy code, it is often impractical to lower existing basement floors or raise existing roof construction to achieve the ceiling heights for habitable space in new construction as per current code. The code's ceiling height requirements for new construction also make it difficult to incorporate attached accessory dwelling units into existing buildings, which runs counter to the goals of many zoning codes. In response some jurisdictions, including Seattle, approve lower ceiling heights for converting to habitable space in existing buildings when they were constructed and met ceiling heights allowed in previous legacy codes.

This proposal provides flexibility for ceiling height in basements and habitable attics in existing buildings. It permits a ceiling height of not less than 6 feet 8 inches as is currently permitted in Appendix J section AJ109.7. It extends this flexibility to habitable attics. The first exception maintains the sloped ceiling height provisions per R305.1 for new construction but lowers the minimum ceiling height requirement for 50% of the room from 7 feet to 6 feet 8 inches. The second exception maintains the allowance for beams, girders, and other obstructions that is permitted in new construction.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal reduces when a basement floor must be lowered or an existing roof raised to meet ceiling height requirements when converting existing basements or habitable attics to habitable space.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R305.1.2 Habitable attics and basements in existing buildings. Where ~~a *change of occupancy* creates~~ a *habitable attic* or *habitable* space in a *basement*<u>is created in an existing building</u>, ceiling height shall not be less than 6 foot 8 inches (2032 mm). <u>Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 4 inches (1931 mm)</u>.
Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 6 feet 8 inches (2134 mm).
2. At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

Committee Reason: The modification to remove 'change of occupancy' was because this term is not used in the IRC. The addition of the last sentence in Section R305.1.2 allows for a lower height in occupiable, but not habitable spaces. The proposal was approved as modified because lower heights in a basement are not a life safety issue. It is a good item to move from the appendix and into the body of the code. This option is needed for flexibility in existing homes to extend living space. This is a common request. Allowing for this will encourage people to apply for permits for lower height basements. (Vote: 7-3)

Final Hearing Results

RB82-22 AM

RB84-22

Original Proposal

IRC: R308.4.6

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R308.4.6 Glazing adjacent to stairs and ramps. Glazing where the bottom exposed edge of the glazing is less than 36 inches (914 mm) above the plane of the adjacent walking surface of _*stairs*_ ~~*stairways*~~, landings between flights of stairs and*ramps* shall be considered to be a hazardous location.

Exceptions:

1. Where glazing is adjacent to a walking surface and a horizontal rail is installed at 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 have a cross-sectional height of not less than $1^1/_2$ inches (38 mm).
2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

Reason: The title of this section references "stairs". A "stairway" includes all necessary landings, such as top, bottom, and intermediate. In this section, after listing "stairways" it then refers to "landings between flights". This is because the intent of this section is not "stairways", but rather "stairs".
There is already a hazardous location at the bottom of a stairway, as specified in Section R308.4.7, which extends for 5 feet horizontally from the nosing. There is no need for section 308.4.6 to reference "stairways" and capture the bottom landing, as otherwise it would result in a hazardous location 3 feet from the outer edge of the 3-foot landing, effectively 6 feet from the bottom tread nosing. This would result in a larger area at the bottom of stairways than the section specifically addressing the bottom of stairways.

If the top landing were included in this using the term "stairway" as defined, it would require glazing just under 6 feet away from the top of the stairway to be safety glazed. This does not sound like the intent of this section. Changing stairway to stairs clarifies a better minimum application of the code.

Cost Impact: The code change proposal will decrease the cost of construction
Where this section is interpreted precisely as the terms are defined, this proposal will reduce the cost of construction by reducing the area a the top and bottom of stairways where safety glazing is required. Where this is interpreted more practically, there will be no change in the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R308.4.6 Glazing adjacent to stairs and ramps. Glazing where the bottom exposed edge of the glazing is less than 36 inches (914 mm) above the plane of the adjacent walking surface of _*flights of*_ *stairs* , _ramp runs,_ landings between flights of stairs and _landings between ramp runs_ ~~*ramps*~~ shall be considered to be a hazardous location.
Exceptions:

1. Where glazing is adjacent to a walking surface and a horizontal rail is installed at 34 to 38 inches (864 to 965 mm) above the walkin 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 have a cross-sectional height of not less than $1^1/_2$ inches (38 mm).

2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

Committee Reason: The modification was to make the terminology consistent for flights of stairs in the section and to add landings associated with ramp runs. The committee requested staff add the additional words needed to clarify that the landings are between stair flights and between ramp runs, not between a stair flight and a ramp run. The proposal was approved as modified because it clarifies that this section is to apply to stairs with one step or greater, ramp runs and and any required associated landings. (Vote: 10-0)

Final Hearing Results

RB84-22	AM

RB85-22

Original Proposal

IRC: R308.6.5
Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R308.6.5 Screens not required. Screens shall not be required where laminated glass complying with Item 1 of Section R308.6.2 is used as single glazing or the inboard pane in multiple glazing. Screens shall not be required where fully tempered glass is used as single glazing or the inboard pane in multiple glazing and either of the following conditions is met:

1. The glass area is 16 square feet (1.49 m^2) or less; the highest point of glass is not more than 12 feet (3658 mm) above a walking surface; the nominal glass thickness is not more than $^3/_{16}$ inch (4.8 mm); and for multiple glazing only the other pane or panes are fully tempered, laminated or wired glass.
2. The ~~glass area is greater than 16 square feet (1.49 m²); the~~ glass is sloped 30 degrees (0.52 rad) or less from vertical; and the highest point of glass is not more than 10 feet (3048 mm) above a walking surface.

Reason: Reason: R308.6.5, Item 2 is not consistent with IBC 2405.3, Item 1. This change would provide consistency and eliminate an issue in the IRC where glass areas smaller than 16 square feet would require a screen if glass thickness exceeds 3/16". See below 2405.3
2405.3 Screening

. 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.

For clarification, the tables below show Examples R308.6.5 Glass Retention Screens NOT Required, and IBC 2405.3 Glass Retention Screens NOT Required:

R308.6.5 Glass Retention Screens NOT Required – Shaded Cells

Glazing Area – A (ft^2)	Glazing Slope (degrees)	Height above Walking Surface – H (ft)	Glass Thickness - t (in)
> 16	≤ 30°	≤ 10	n/a
≤ 16	n/a	≤ 12	≤ 3/16
Examples			
20	30°	10	any
20	45°	10	any
20	30°	11	any
16	any	12	3/16
16	any	13	3/16
16	any	12	1/4
4	any	10	1/4
4	any	10	1/4
4	any	11	1/4

Thicker glass (>3/16”) means screens are required even for small glass areas? Why?

IBC 2405.3 Glass Retention Screens NOT Required – Shaded Cells

Glazing Area – A (ft^2)	Glazing Slope (degrees)	Height above Walking Surface – H (ft)	Glass Thickness - t (in)
n/a	≤ 30°	≤ 10	n/a
≤ 16	n/a	≤ 12	≤ 3/16
Examples			
any	30°	10	any
any	45°	10	any
any	30°	11	any
16	any	12	3/16
16	any	13	3/16
16	any	12	1/4

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 is for clarification and consistency between codes only. There are no technical changes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved because it allows smaller skylights to use exception 2. This would be consistency between IRC and IBC. (Vote: 9-1)

Final Hearing Results

RB85-22	AS

RB86-22

Original Proposal

IRC: R309.4

Proponents: Mike Fischer, Kellen, International Door Association (mfischer@kellencompany.com)

2021 International Residential Code

Revise as follows:

R309.4 Automatic garage door openers. Automatic garage door openers, if provided, shall be *listed* and *labeled* in accordance with UL 325, <u>and shall be installed in accordance with UL 325 and the manufacturer's installation instructions</u>.

Reason: Garage door openers are required to comply with UL 325. Typical residential garage door openers include devices such as photoelectric sensors, wall-mounted controls, and release mechanisms. It is important that the installer follow the manufacturers instructions and the requirements of UL 325. DASMA publishes a series of technical data sheets covering a variety of topics related to garage door opener safety and compliance to UL 325.
One example included in the DASMA TDS 364 is the following: "to reduce the risk of severe injury or death, it is essential that photoelectric sensors be installed properly according to manufacturer's instructions."

IDA supports the proper installation of garage doors and automatic openers to help ensure that appropriate safety standards are met. This proposal will help improve compliance and safety of installed products.

Bibliography: DASMA TDS 364: Installation Location of Photoelectric Sensors on Residential Garage Doors
https://www.dasma.com/wp-content/uploads/2021/12/TDS364.pdf

DASMA TDS 369: Frequently Asked Questions Regarding Automated Residential Garage Door Systems

https://www.dasma.com/wp-content/uploads/pubs/TechDataSheets/OperatorElectronics/TDS369.pdf

DASMA TDS 167: Residential Sectional Garage Door and Electric Operator Checklist for Home Inspectors and Consumers

https://www.dasma.com/wp-content/uploads/2021/06/TDS167.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proper installation of garage door openers is part of the requirements to meet listings and labels. The proposal does not add additional requirements but clarifies the intent of the code and referenced standards.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R309.4 Automatic garage door openers. Automatic garage door openers, if provided, shall be *listed* and *labeled* in accordance with UL 325, and shall be installed in accordance with ~~UL 325 and~~ the manufacturer's installation instructions.

Committee Reason: The modification deleting UL325 because the instructions will already include UL325 testing and installation instructions for entrapment issues. Keeping this reference in would add confusion in the field. The proposal was approved as modified because the installation instructions improved safety for garage doors. (Vote: 10-0)

Final Hearing Results

RB86-22	AM

RB87-22

Original Proposal

IRC: 309.6 (New), 309.6.1 (New), 309.6.2 (New), ALI (New)

Proponents: Dale Soos, Automotive Lift Institute, Inc. (ALI), Automotive Lift Institute, Inc. (ALI) (dale@autolift.org); RW Bob O'Gorman, Automotive Lift Institute (ALI), Automotive Lift Institute (ALI) (bob@autolift.org)

2021 International Residential Code

Add new text as follows:

309.6 Automotive Lifts.
Where provided, automotive lifts shall comply with ANSI/ALI ALCTV and Sections 309.6.1 and 309.6.2.

309.6.1 Installation.
Automotive lifts shall be installed in accordance with ANSI/ALI ALIS, the lift manufacturer's installation instructions, and listing and labeling requirements. Consideration shall be given to the foundation where an automotive lift will be affixed, to ensure it will support the weight and structural reactions of an installed automotive lift. Automotive lifts shall not be installed within the habitable space of a dwelling unit.

309.6.2 Electrical Installation.
Automotive lifts shall be installed in accordance with NFPA 70, and shall be*listed* and *labeled* to UL 201 and other standards as determined by the listing agency when evaluated to the requirements of ANSI/ALI ALCTV.

Add new standard(s) as follows:

ALI ALCTV-2017. Standard for Automotive Lifts-Safety Requirements for Construction, Testing and Validation (ANSI)

Reason: The reason for adding this new section to the IRC is to close the loophole where uncertified products with a real threat to life-safety are being installed in the residence and bypassing all safety requirements and to make sure that automotive lift products are safe. Uncertified automotive lift products are available to the homeowner, who assumes that all products on the marketplace must be tested and certified to meet applicable product standards. This is not the case for automotive lift products. Retailers are often not aware they are marketing uncertified products. They are being dumped on the marketplace and the unsuspecting homeowner purchases these, to his detriment. By including already a requirement in the *International Building Code*, the homeowner can have a product which is backed by a valid certification such as those available in the workplace.

Other life-safety devices such as furnaces, boilers, water heaters, A/C units & heat pumps and more mundane products such as fans, water heaters, computers, televisions, luminaires, home appliances, etc. now carry product safety listings. The ANSI/ALI ALCTV automotive lift standard does not have separate performance criteria to establish or define commercial, industrial or homeowner categories . Chapter 30 of the *International Building Code* specifies in both Section & Table 3001.3 the ANSI/ALI ALCTV standard is used for the design, construction, installation, alteration, repair and maintenance of these automotive lifting products. This entry is an attempt to harmonize the *International Building Code* and the *International Residential Code* for these products.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Other industries have discovered that, by making mandatory certification of products a requirement, there has been little to no increase in the overall cost to the consumer by increasing manufacturing efficiencies and having a defined standard to work toward. There are currently 21 reputable manufacturer's producing automotive lifts for the marketplace, both commercial and residential. Any impact created by inclusion of these requirements will be to those importers that are skirting North America's safety standards.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because the automotive lift requirements proposed did not include structural information and foundation requirements. (Vote: 7-3)

Public Comments

Public Comment 1

Proponents: Dale Soos, Automotive Lift Institute, Inc. (ALI), Automotive Lift Institute, Inc. (ALI) (dale@autolift.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

309.6 Automotive Lifts.
Where provided, automotive lifts shall ~~comply~~ <u>be *listed* and *labeled* in accordance</u> with ANSI/ALI ALCTV and Sections 309.6.1 and 309.6.2.

309.6.1 Installation.
Automotive lifts shall be installed in accordance with~~ANSI/ALI ALIS~~<u>ANSI/ALI ALCTV</u>, <u>the listing, and</u> the lift manufacturer's installation instructions~~., andlisting and labeling requirements~~. ~~Consideration shall be given to the foundation where an automotive lift will be affixed, to ensure it will support the weight and structural reactions of an installed automotive lift.~~ Automotive lifts shall not be installed within the habitable space of a dwelling unit.

309.6.2 ~~Electrical Installation~~.
~~Automotive lifts shall be installed in accordance with NFPA 70,the listing, and the manufacturer's installation instructions. and shall be *listed* and *labeled* to UL 201 and other standards as determined by the listing agency when evaluated to the requirements of ANSI/ALI ALCTV~~.

Commenter's Reason: These Public Comments reflect changes made as a result of reviewing the *International Residential Code* Committee's reason for Disapproving the original submittal, as well as those changes made by a Floor Modification (RB87-22-SOOS-1) to more closely align with language present, and the terms defined, within the existing Code.
It should be noted the ANSI/ALI ALCTV standard does now and has always required a third-party product certification for any product claiming compliance. Part of the standard's evaluation criteria is examination of the lift product's strength factors, the minimum of which are defined within ALCTV, as well as specifications for the specific lift's foundation, floor and anchoring structural requirements. To clarify, the automotive lifts are to be installed per the standard, the product's listing requirements, and the manufacturer's instructions.

Originally submitted section 309.6.2 (Electrical Installation) is being removed because the electrical requirements are covered in the ANSI/ALI ALCTV standard and the previous paragraph.

As is noted in the original Reason Statement for RB87-22, this is an extremely important change to the Code for reasons of threat to life safety when using an automotive lift.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Other industries have discovered that, by making mandatory certification of products a requirement, there has been little to no increase in the overall cost to the consumer by increasing manufacturing efficiencies and having a defined standard to work toward. There are currently 21 reputable manufacturer's producing automotive lifts for the marketplace, both commercial and residential. Any impact created by inclusion of these requirements will be to those importers that are skirting North America's safety standards.

Final Hearing Results

RB87-22 AMPC1

RB88-22

Original Proposal

IRC: R309.6 (New), UL Chapter 44 (New)

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Solar 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); Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

R309.6 Electric vehicle charging systems. Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be listed and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be listed and labeled in accordance with UL 2594.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

2202–2009	Electric Vehicle (EV) Charging System Equipment–with Revisions through February 2018
2594–2016	Electric Vehicle Supply Equipment

Reason: Electric vehicles are rapidly becoming more common. This proposal is in alignment with the requirements in both the 2018 and 2021 IBC for motor vehicle-related occupancies (IBC Section 406.2.7), which includes private garages. These requirements on how to install these systems should also be in the IRC, for those installations where these systems are provided.
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.

BCAC REASON: Electric vehicles are rapidly becoming more common. This proposal is in alignment with the requirements in both the 2018 and 2021 IBC for motor vehicle-related occupancies (IBC Section 406.2.7), which includes private garages. These requirements on how to install these systems should also be in the IRC, for those installations where these systems are provided.

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/.

Bibliography: Reference:

IBC 406.2.7 Electric vehicle charging stations and systems. Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be listed and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be listed and labeled in accordance with UL 2594. Accessibility to electric vehicle charging stations shall be provided in accordance with Section 1108.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal aligns with the requirements in the IBC. These systems are not mandated to be installed, but if they are, the installation should be done properly.

BCAC Cost Impact: This proposal aligns with the requirements in the IBC. These systems are not mandated to be installed, but if they are, the installation should be done properly.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposed text is for where electrical vehicle charging stations are required, so these requirements provide for a level of safety where these are installed. This is a correlation with requirements in the IBC. The title should be revised to match the text. (Vote: 9-1)

Final Hearing Results

RB88-22	AS

RB89-22

Original Proposal

IRC: SECTION R310.1

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

2021 International Residential Code

SECTION R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics* and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court ~~having a minimum width of 36 inches (914 mm)~~ that opens to a *public way*.

Exceptions:

1. *Storm shelters* and *basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   2.1. One means of egress complying with Section R311 and one *emergency escape and rescue opening*.
   2.2. Two means of egress complying with Section R311.
3. A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).

Reason: The intent is to remove redundant language Code change RB86-19 AM added a 36” wide route to the public way to the main text, and RB87-19 AS added exception 3 which is intended to also require a 36” wide route to the public way. The exception addresses a specific concern, so the 36” requirement is not needed in the main paragraph.

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
There are not changes to construction requirements for the route from the EERO to the public way. These are clarifications only by a removal of duplicate language.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as this removes redundant language found in the main body of Section R310.1 and Exception 3. (Vote: 10-0)

Final Hearing Results

RB89-22	AS

RB92-22

Original Proposal

IRC: R310.1
Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

CHAPTER 3 BUILDING PLANNING

SECTION R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics* and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court having a minimum width of 36 inches (914 mm) that opens to a *public way*.

Exceptions:

1. ~~*Storm shelters* and *basements*~~ *Basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Storm shelters constructed in accordance with ICC 500.

~~2.~~ 3. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

~~2.1.~~ 3.1. One means of egress complying with Section R311 and one *emergency escape and rescue opening*.

~~2.2.~~ 3.2. Two means of egress complying with Section R311.

~~3.~~ 4. A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).

Reason: The intent of this proposal is to eliminate a possible mis-interpretation. The 200 sq.ft. limit is meant to be only for basements used to house mechanical equipment. The EERO should not be installed in any size residential shelter because the additional opening is a reduction in safety for the occupants in the storm shelter during a tornado. Residential shelters have specific criteria in ICC 500.
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
There are no changes to construction requirements. These are clarifications only for storm shelters.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: By splitting Exception 1 into two parts it is clear that the storm shelters are not limited to the 200 sq.ft.. That size limitation is applicable for mechanical equipment rooms. (Vote: 10-0)

Final Hearing Results

RB92-22	AS

RB98-22

Original Proposal

IRC: R310.5
Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

R310.5 Replacement windows for emergency escape and rescue openings. Replacement windows installed in buildings meeting the scope of this code shall be exempt from Sections R310.2 and R310.4.4, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window ~~is~~ shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Thereplacement window is not part of a change of occupancy.

Reason: The change to shall be permitted is for two reasons:
1) Consistency with IEBC 505.3, 702.5.1 and IRC R310.7.1 and Appendix J AJ102.4.3.1

2) Allows for the largest window with or without a change in the style of the window.

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 increases options for the designer for replacement windows.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it improves consistency in terminology across sections that deal with replacement windows. (Vote: 10-0)

Final Hearing Results

RB98-22 AS

RB99-22

Original Proposal

IRC: R310.5.1 (New), AJ102.4.3, AJ102.4.3.1

Proponents: Ardel Jala, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (micah.chappell@seattle.gov)

2021 International Residential Code

R310.5 Replacement windows for emergency escape and rescue openings. Replacement windows installed in buildings meeting the scope of this code shall be exempt from Sections R310.2 and R310.4.4, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window is of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.

Add new text as follows:

R310.5.1 Window opening control device and fall protection device height. Window opening control devices or fall protection device shall be located at a height in accordance with Section R310.1.1 or at as low a height as the device can be installed within the existing clear opening.

Delete without substitution:

~~**AJ102.4.3 Replacement windows for emergency escape and rescue openings.** Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 provided that the replacement window meets the following conditions:~~

1. ~~The replacement window is the manufacturer’s largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.~~
2. ~~Where the replacement window is not part of a change of occupancy.~~

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

~~**AJ102.4.3.1 Control devices.** Emergency escape and rescue openings with window opening control devices or fall prevention devices complying with ASTM F2090, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.~~

Reason: This is one of (4) proposals that pulls existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety. Appendix J section AJ102.4.3 and section R310.5 both provide a break on full compliance for replacement windows for emergency escape and rescue openings. This proposal provides flexibility for the vertical height of the window opening control devices and fall protection devices in existing construction. This proposal deletes Appendix J section AJ102.4.3 which is already covered in sections R310.5 and

R310.1.1.

The maximum height to the bottom of the clear opening, i.e. the sill height, of an emergency escape and rescue opening is 44" per section R310.2.3. Under limited conditions, section R310.5 permits replacement windows to re-use the existing frame or existing rough opening and waives the requirements of section R310.2 including the maximum height from floor requirement of section R310.2.3.
The maximum height of window opening control devices and fall prevention devices for emergency escape and rescue openings is 70 inches above the finished floor per section R310.1.1. However since replacement windows for emergency escape and rescue openings have no maximum sill height requirement, the existing sill height could be located at a height 70 inches above the finished floor or higher.

This proposal adds a new section R310.5.1 that permits window opening control devices and fall prevention devices for replacement windows in emergency escape and rescue openings to be installed at the lowest height that the device can be installed within the clear opening when the bottom of the clear opening is higher than 70 inches and cannot be installed at the maximum height of 70 inches above the finished floor as per section R310.1.1. The proposal aligns the required window opening control device or fall prevention device height for a replacement window with the break given to replacement windows on maximum sill height.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the height the window control device or fall prevention device may be installed under certain conditions. It does not change the technical requirements for when a control window device is required so there is no cost impact.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R310.5 Replacement windows for emergency escape and rescue openings. Replacement windows for emergency escape and rescue openings installed in buildings meeting the scope of this code shall be exempt from Sections R310.2 and R310.4.4, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window is of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.

Committee Reason: The purpose of the modification was to move the title into the code text to better describe the intent of the section. The provides good guidance for remodels in the code text and is therefore no longer needed in the appendix. (Vote: 10-0)

Final Hearing Results

RB99-22	AM

RB100-22

Original Proposal

IRC: R311.3.2, R311.7.6

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

2021 International Residential Code

R311.3 Floors and landings at exterior doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall be not less than the door served. Landings shall have a dimension of not less than 36 inches (914 mm) measured in the direction of travel. The slope at exterior landings shall not exceed $^{1}/_{4}$ unit vertical in 12 units horizontal (2 percent).

Exception: Exterior balconies less than 60 square feet (5.6 m^2) and only *accessed* from a door are permitted to have a landing that is less than 36 inches (914 mm) measured in the direction of travel.

R311.3.1 Floor elevations at the required egress doors. Landings or finished floors at the required egress door shall be not more than $1^{1}/_{2}$ inches (38 mm) lower than the top of the threshold.

Exception: The landing or floor on the exterior side shall be not more than $7^{3}/_{4}$ inches (196 mm) below the top of the threshold provided that the door does not swing over the landing or floor.

Where exterior landings or floors serving the required egress door are not at *grade*, they shall be provided with access to *grade* by means of a *ramp* in accordance with Section R311.8 or a *stairway* in accordance with Section R311.7.

Revise as follows:

R311.3.2 Floor elevations at other exterior doors. At exterior ~~Doors~~ doors other than the required egress door, the exterior side shall be provided with landings or floors not more than $7^{3}/_{4}$ inches (196 mm) below the top of the threshold.

Exception: ~~A top~~ An exterior landing or floor is not required at the exterior doorway where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

R311.3.3 Storm and screen doors. Storm and screen doors shall be permitted to swing over exterior stairs and landings.

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each *stairway*. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

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

1. A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.
2. At an enclosed garage, the top landing at the stair shall be permitted to be not more than 7 3/4 inches (196 mm) below the top of the threshold.
3. At exterior doors, a top landing is not required for an exterior stairway of not more than two risers, provided that the door does not swing over the stairway.

R311.7.8 Handrails. *Handrails* shall be provided on not less than one side of each flight of stairs with four or more *risers*.

Reason: This proposal started as question - Can the landing or steps into a garage be the same as permitted for exterior doors or not?

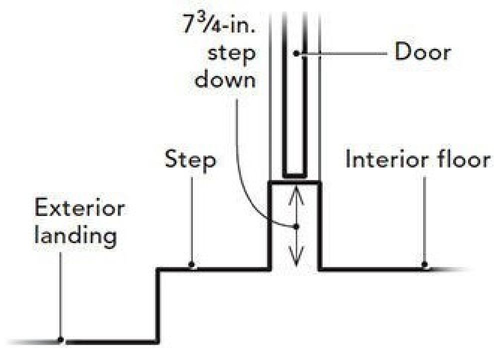
The following are current requirements - There is a requirement for landings at exterior doors (R311.3) and a requirement for landings at the top and bottom of stairways (R311.7.6). The required egress door has to open directly into a public way, yard or court (R311.1), so it has to be an exterior door. Egress is not permitted through a garage (R311.1).

Interior doors not have requirements for landings, so going out to a single step or multiple steps would be covered by the stairway landing requirement in Section R311.7.6. The current exception clarifies that steps into a garage are considered interior stairways.

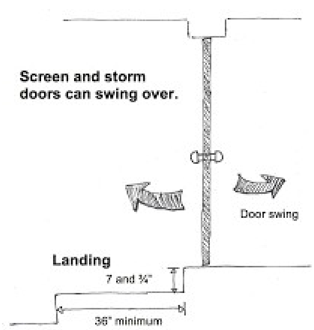
The modifications –

R311.3.2 – This is a requirement for a landing or floor at both sides of an exterior doorway. This section has 'exterior' in the title, and is a subsection of 'exterior doors', but does not have 'exterior' in the text. Since titles are not part of the text, this could be read as all door, or it could be read to allow a 7-3/4" drop between the floor and the threshold on both sides of the door. The modification to the body of the text would limit this to exterior doors and the exterior side for the step down. The current exception is for a stairway landing, not a door landing, so this needs to be more specific to door landings to match the requirement in the main paragraph. "Floor" is added to address balconies and decks.

This is what is permitted with current text for exterior doors other than the means of egress doorway. While perhaps there should be a threshold limit (not proposed here), the current allowances is a serious tripping hazard.

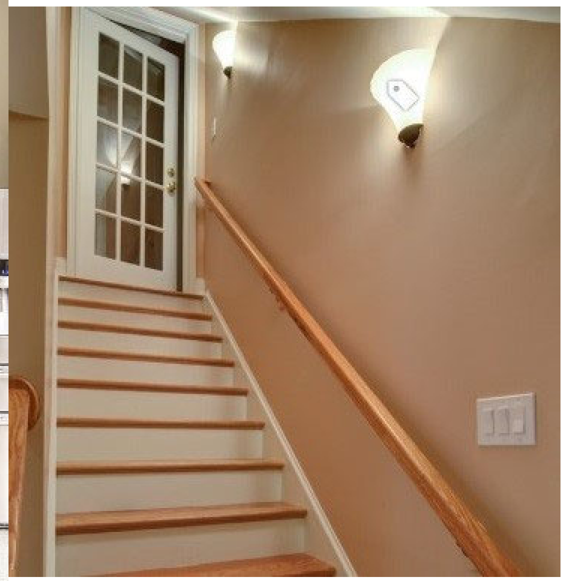


Was this not the intended allowance?



R311.7.6 – This is the section for stairway landings. Interior doors do not have a doorway landing requirement in the IRC. The new exception #2 allows for a garage access door to swing out over a landing that is a step down, similar to an exterior door. The current exception #1 says the door has to swing in. Exception 3 for stairway landings at exterior stairways is added so that R311.3.2 and R311.7.6 are coordinated for landings at exterior doors with steps – literally this is the same landing space, but from two different requirements.

This is an example of the R311.7.6 with the current Exception 1.

This is an example of R311.7.6 new exception 2 – allowing for a step down to a landing or floor in a garage – the door can swing in or out. This is currently permitted for exterior doors (R311.3.2)


This is an example of R311.7.6 new exception 3 – which is equal to the intent of R311.3.2 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 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 clarifies existing requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal was disapproved because a 7-3/4" high threshold is needed to help at exterior doors with snow and water intrusion. (Vote: 10-0).

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 Residential Code

R311.3.2 Floor elevations at other exterior doors. ~~At e~~ Exterior doors other than the required egress door~~, the exterior side~~ shall be provided with landings or floors not more than $7^3/_4$ inches (196 mm) below the top of the threshold.

Exception: An exterior landing or floor is not required at the exterior doorway where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

Commenter's Reason: The testimony and committee reason were all against not loosing the 7-3/4” threshold at exterior doors due to water and snow infiltration. That portion has been removed from the change with the above deletion. The rest of the language at this section is strictly a clarification that Section R311.3.2 is applicable to exterior doors. This was in the title, but not in the text.
The original intent of this proposal was to allow for a step or landing in step down at a door into a garage similar to what is permitted at an exterior door. That remains as submitted. There was no testimony against this idea.

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 requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

Final Hearing Results

RB100-22	AMPC1

RB101-22

Original Proposal

IRC: R311.4

Proponents: Kevin Duerr-Clark, New York State Department of State, New York State Department of State (kevin.duerr-clark@dos.ny.gov); Gerard Hathaway, New York State Department of State, self (gerard.hathaway@dos.ny.gov); Daniel Carroll, New York State Department of State (daniel.carroll@dos.ny.gov)

2021 International Residential Code

Revise as follows:

R311.4 Vertical egress. Egress from basements andhabitable levels ~~including habitable attics and *basements*~~ that are not provided with an egress door in accordance with Section R311.2 shall be by a *ramp* in accordance with Section R311.8 or a *stairway* in accordance with Section R311.7.

Reason: The way this section is worded has provided some confusion in interpretation by the code enforcement community. By placing basements at the end, and including the term habitable attics before it, some have interpreted that the word habitable applies to both attics and basements. As supported by the ICC commentary to this section of code, this is intended to apply to all basements, not just habitable ones. Additionally, by saying habitable levels, habitable attics is already included. Therefore, to make it even cleaner, habitable attics can be removed from the statement. If it is preferred to leave habitable attics in to insure it is included, moving basements to the beginning is still necessary.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is simply a clean up of existing text to increase clarity. It does not change the actual provision based on how the ICC commentary interprets the text.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as because egress should apply to all basements, not just habitable basements. This is a clarification of the intent of the code. (Vote 10-0)

Final Hearing Results

RB101-22 AS

RB103-22

Original Proposal

IRC: R311.7.5.3

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

2021 International Residential Code

Revise as follows:

R311.7.5.3 Nosings. ~~*Nosings* at treads~~Treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^{9}/_{16}$ inch (14 mm) or a bevel not greater than $^{1}/_{2}$ inch (12.7 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19 mm) and not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^{3}/_{8}$ inch (9.5 mm) within a *stairway*.

Exception: A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).

Reason: Nosing is a defined term in both the IRC and IBC as: *"The leading edge of treads of stairs and of landings at the top of stairway flights"*. Deleting the confusing redundant use of the term at the beginning of the sentence is editorial and clarifies. Please approve as submitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is and editorial revision for clarification with no technical changes to the requirements for nosings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it removes redundant language. (Vote: 9-0)

Final Hearing Results

RB103-22	AS

RB104-22

Original Proposal

IRC: R311.7.5.3

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R311.7.5.3 Nosings. *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^{9}/_{16}$ inch (14 mm) or a bevel not greater than $^{1}/_{2}$ inch (12.7 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19 mm) and not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^{3}/_{8}$ inch (9.5 mm) within a *flight* of *stairs* ~~*stairway*~~.

Exception: A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).

Reason: Both riser height in R311.7.5.1 and tread depth in R311.7.5.2 are only required to be uniform “within any flight of stairs” but nosing projection references “stairway” which would include all the flights in a single stairway. If the riser height and tread depth can change after a landing, so should the nosing projection be permitted to change.
It is not uncommon for a single flight of exterior deck stairs to land on a concrete landing. It is also not uncommon for this landing to have a single tread and two risers down to grade, making it another stair in the stairway. It is common to use an 11 inch concrete tread depth to eliminate a nosing projection. There is no reason that the concrete flight of stairs would need a nosing projection simply because the deck stair flight has them and they share a path in a stairway to reach grade.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal expands the design freedom of stairway construction without reducing safety. In itself, this does not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it clarifies that the nosing provisions apply to the steps on a flight of stairways and not the nosing on the landings. (Vote: 8-1)

Final Hearing Results

RB104-22 AS

RB105-22

Original Proposal

IRC: R311.7.5.3

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

2021 International Residential Code

SECTION R311 MEANS OF EGRESS

Revise as follows:

R311.7.5.3 Nosings. *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^{9}/_{16}$ inch (14 mm) or a bevel not greater than $^{1}/_{2}$ inch (12.7 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19 mm) and not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^{3}/_{8}$ inch (9.5 mm) within a ~~*stairway*~~ *flight* and the landing at the top of the *flight*.

Exception: A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).

[RB] FLIGHT. A continuous run of rectangular treads or *winders* or combination thereof from one landing to another.

[RB] NOSING. The leading edge of treads of stairs and of landings at the top of *stairway* flights.

[RB] RISER (STAIR). The vertical component of a step or *stair*.

[RB] STAIR. A change in elevation, consisting of one or more *risers*.

[RB] STAIRWAY. One or more flights of stairs, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another.

Reason: Both the IRC & the IBC regulate tread depth, *riser* height and *nosing* projection within a *flight* of *stair*s. *Stairways* are made up of multiple *flight*s of *stair*s with landings in between. Each *flight* is allowed to have different *riser* heights and tread depths, however the current language locks in the *nosing* projection to all the *flight*s within the *stairway*, rather than just the *flight.* The reason the current language uses *stairway* over *flight* is that the *nosing* on the top landing needs to be included with the *flight* to make sure the *nosing* projection on both meet the criteria within R311.7.5.3. Because the top landing's *nosing* is not a part of the definition of a *flight*, see definition, the additional text "and the landing at the top of the *flight*" is being added to tie-in the top landing's *nosing* to the *flight* it serves and clarify that the 3/8" maximum between the smallest and largest *nosing* projection includes the top landing for the *flight*.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is not adding or subtracting any technical requirements within the code which will increase or decrease cost.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This proposal was approved as it did two things. It coordinated the nosing requirement for the flight of stairs the same as RB104-22 and it added the nosing on the landings into the requirement. This will improve safety and reduce a possible tripping hazard. (Vote: 8-1)

Final Hearing Results

RB105-22 AS

RB106-22

Original Proposal

IRC: R311.7.5.3

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

2021 International Residential Code

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.7.5.3 Nosings. *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than $^9/_{16}$ inch (14 mm) or a bevel not greater than $^1/_2$ inch (12.7 mm). A *nosing* projection not less than $^3/_4$ inch (19 mm) and not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^3/_8$ inch (9.5 mm) within a *stairway*.

~~Exception~~ **Exceptions**:

1. A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).
2. Where risers are *open*, the maximum nosing projection shall be permitted to exceed 1 1/4 inches (32 mm).

[RB] FLIGHT. A continuous run of rectangular treads or *winders* or combination thereof from one landing to another.

[RB] NOSING. The leading edge of treads of stairs and of landings at the top of *stairway* flights.

[RB] STAIR. A change in elevation, consisting of one or more *risers*.

[RB] STAIRWAY. One or more flights of stairs, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another.

Reason: This is the second of 2 code change proposals to allow an exception to the code to exceed the maximum nosing projection limit of 1-1/4" on stair treads when open risers are allowed and installed within a stair flight. The first code change was submitted during the Part A portion of this current code cycle, proposal number E64-21 was approved by the means of egress committee in the spring of 2021, the final action hearing vote in the fall of 2021 and the government members vote in 2021 and is slated to be published in the model 2024 IBC. The code change allows for when open risers are within a stair flight, a user's foot can exceed the end of the tread on ascent. Allowing the tread to be extended further under the tread above, nosing, allows for more tread surface and foot support. This code change will provide uniformity between the IBC and IRC.

Bibliography: Approved Code Change E64-21 for the PART A Means of Egress 2024 Code Cycle

Cost Impact: The code change proposal will decrease the cost of construction
Any cost impact will be through the non-alteration of stock materials by the manufacture and or installer during fabrication and or installation, which would now not be required to be altered.

EX: Stock 12-inch tread, where the location can only accommodate a 10-inch tread depth, the material would not be required to be cut down or altered for the 3/4-inch, to reduce the nosing projection to meet the maximum 1.25-inch current requirement (10” + 1.25” = 11.25”).

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The addition of Exception 2 to Section R311.7.5.3 was approved in recognition of the difficulty to measure nosings for open stairways - where there are no risers to measure against. (Vote: 8-1)

Final Hearing Results

RB106-22	AS

RB107-22

Original Proposal

IRC: R311.7.6
Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each*flight of stairs* ~~*stairway*~~. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

Exception. The top landing of an interior *stairway*, including those in an enclosed garage, shall be permitted to be on the other side of a door located at the top of the *stairway* ~~A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage~~, provided ~~that a~~ the door does not swing over the *stairs*.

Reason: A stairway is defined as all stairs and necessary landings. It may be made up of multiple stairs/flights. Therefore, it is actually each "flight of stairs" that requires a landing at top and bottom. The current exception for interior stairway top landings is poorly worded and does not present the intent. The intent is that there is still a landing surface at the top of interior stairways, but that it can be on the other side of a door. As worded, the sentence literally states that a landing is not required at the top of the stairway. Period. The mention of a door is only that it can't swing over the stairs, not that there must be a door at all. But worse… it says a landing is not required at the top of a "flight of stairs" not the whole stairway. So that could be an intermediate landing between two "flights of stairs" that is not required, when the real intent is on the top landing of the "stairway" The top landing of the top flight of stairs.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the intent of the code as it is most likely already being interpreted. Therefore there is no definitive change in the cost of construction in any direction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The revised exception to Section R311.7.6 is a clarification of the landing requirements for stairways at an interior door. (Vote: 10-0)

Final Hearing Results

RB107-22	AS

RB108-22

Original Proposal

IRC: R311.7.6

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each *stairway*. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

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

1. A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.
2. Exterior *stairways* to grade with three or fewer risers serving a deck, porch or patio shall have a minimum bottom landing width of 36 inches, provided the stairway is not the required access to grade serving the required egress door.

Reason: This proposal specifically addresses the popular design of ground level backyard decks desired by your fellow Americans. Ground level decks with monumental wrap-around stairs are a wonderful way to create a deck that is an extension of the house and an extension of the yard. However, once a single tread is built around the edge of a deck only 14 inches above grade, two risers are created and you now have a flight of stairs and a stairway, and that means a landing at the bottom. In increasing frequency, building authorities across the country are interpreting the bottom landing of a stairways to require a solid, manufactured surface, such as concrete, flagstone, or other hardscaping. Some of these authorities would require the lawn cut out and a manufactured surface installed around the entire edge of the deck (width of the stairs) and 3 feet out into the yard. For a single tread this is nearly four feet into the yard. It is my opinion that this is excessive guidance to governments for the regulation of our backyards, and will only serve to further alienate the public's trust in the code.

This proposal will retain a "landing", however interpreted, for only a minimum width of 36 inches on very specific stairways. It is expected that occupants seeking a safer stairway portion in a private home will choose this portion of the stairway. The IBC acknowledges an expectation for the general public in an unfamiliar location to similarly recognize the safer place for their travel on monumental stairways. Though in regard to handrails and not landings, the idea of reduced safety features dependent on the purposefully choice of travel by the occupant is identical. Section 1014.9 of the IBC does not require intermediate handrails on monumental stairways outside of the direct path of egress travel, regardless of the number of risers.
I think we cant trust our neighbors to navigate their own backyard monumental stairways without our complete protection.

The limit of 3 risers was selected as another recognition of reduced hazard, as a handrail is not required. The photo below is just one example of many found in happy backyards across the US. This is an example of how a minimum width landing, as required or interpreted, is provided. However, the remaining edge of the deck can flow into the yard without removing the yard. To tell this homeowner that to meet the minimum safety codes they need to either remove the steps and leave a 20 inch drop, or cut out the grass and install pavers is likely the last conversation any inspector will ever have with them.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will decrease the cost of construction by whatever excessive expense of landing material and labor is being required by certain building officials.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The new Exception 2 to Section R311.7.2.6 clarifies where landings are required at decks stairs that lead to a yard. This would result in an exception for bottom landings where a deck had steps down around the perimeter except for where the steps were part of the required exit discharge. (Vote: 10-0)

Final Hearing Results

RB108-22	AS

RB110-22

Original Proposal

IRC: R311.7.8, R311.7.11.2, R311.7.12.2, R311.8.3, R311.8.3.1, R311.8.3.2, R311.8.3.3, SECTION R312 (New), R312.1 (New), R311.7.8.1, R311.7.8.2, R311.7.8.3, R311.7.8.4, R311.7.8.5, R311.7.8.6

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

2021 International Residential Code

[RB] HANDRAIL. A horizontal or sloping rail intended for grasping by the hand for guidance or support.

SECTION R311
MEANS OF EGRESS

Revise as follows:

R311.7.8 Handrails. *Handrails* shall be provided on not less than one side of each flight of stairs with four or more *risers* <u>and shall comply with Section R312</u>.

R311.7.11.2 Handrails of alternating tread devices. *Handrails* shall be provided on both sides of alternating tread devices and shall comply with <u>Section R312.</u> ~~Sections R311.7.8.2 through R311.7.8.6.~~ ~~*Handrail* height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).~~

R311.7.12.2 Handrails of ship's ladders. *Handrails* shall be provided on both sides of ship's ladders and shall comply with <u>Section R312.</u> ~~Sections R311.7.8.2 through R311.7.8.6.~~ ~~*Handrail* height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).~~

R311.8.3 Handrails required. *Handrails* shall be provided on not less than one side of *ramps* exceeding a slope of 1 unit vertical in 12 units horizontal (8.33-percent slope) <u>and shall comply with Section R312</u>.

Delete without substitution:

~~**R311.8.3.1 Height.** *Handrail* height, measured above the finished surface of the *ramp* slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).~~

~~**R311.8.3.2 Grip size.** *Handrails* on *ramps* shall comply with Section R311.7.8.5.~~

~~**R311.8.3.3 Continuity.** *Handrails* where required on *ramps* shall be continuous for the full length of the *ramp*. *Handrail* ends shall be returned or shall terminate in newel posts or safety terminals. *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.~~

Add new text as follows:

<u>SECTION R312</u>
<u>HANDRAILS</u>

<u>**R312.1 General.**</u> <u>Handrails shall comply with Section R312</u>.

Revise as follows:

~~R311.7.8.1~~ R312.2 **Height.** *Handrail* height, measured vertically from the sloped plane adjoining the tread *nosing*, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height on alternating tread devices and ship's ladders shall be uniform and not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. Where *handrail* fittings or bendings are used to provide continuous transition between flights, transitions at *winder* treads, the transition from *handrail* to *guard*, or used at the start of a flight, the *handrail* height at the fittings or bendings shall be permitted to exceed 38 inches (965 mm).

~~R311.7.8.2~~ R312.3 **Handrail projection.** *Handrails* shall not project more than $4^1/_2$ inches (114 mm) on either side of the *stairway* or ramp.

Exception: Where *nosings* of landings, floors or passing flights project into the *stairway* reducing the clearance at passing *handrails*, *handrails* shall project not more than $6^1/_2$ inches (165 mm) into the *stairway*, provided that the stair width and *handrail* clearance are not reduced to less than that required.

~~R311.7.8.3~~ R312.4 **Handrail clearance.** *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.

~~R311.7.8.4~~ R312.5 **Continuity.** Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrails where required for ramps shall be continuous for the full length of the ramp. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

~~R311.7.8.5~~ R312.6 **Grip size.** Required *handrails* shall be of one of the following types or provide equivalent graspability.

1. Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). If the *handrail* is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) and a cross section of not more than $2^1/_4$ inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).
2. Type II. *Handrails* with a perimeter greater than $6^1/_4$ inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within $^3/_4$ inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than $^5/_{16}$ inch (8 mm) within $^7/_8$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $^3/_8$ inch (10 mm) to a level that is not less than $1^3/_4$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1^1/_4$ inches (32 mm) and not more than $2^3/_4$ inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

~~R311.7.8.6~~ R312.7 **Exterior plastic composite handrails.** *Plastic composite* exterior *handrails* shall also comply with the requirements of Section R507.2.2.

Reason: Currently the 2021 IRC and prior editions duplicated the requirements for handrails under both the stairway and ramp sections, while also duplicating height requirements under alternating treads and ships ladders.
This proposal creates a separate new section for all Handrail's and consolidates the duplicated information in the code, without changing any of the parameters except as noted below.

Specific changes to the text Noted:

1. When moving section R311.8.3.3 to R311.9.4, changed "on" to "for"
    1. "required **on** ramps" now reads "required **for** ramps"

2. In the 2021 IRC code cycle Section R311.7.8.4 removed the catch all wording Safety Terminals, and replaced it with "shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.". However, the same change was not updated to Section R311.8.3.3 for ramps. This left the code with 2 different termination requirements, one for stairs and one for ramps. This code change returns handrails on stairways and ramps to the same requirements.
3. The pointers in R311.11.2 and R311.12.2 text deleted and moved to Section R312.2 Height.
4. "or ramp" was added to the section R312.3 Handrail Projection, this does add a new requirement to ramp handrails within the IRC, it is the same in the IBC.
5. We inserted "also" in Section R312.7 which was moved from R311.7.8.6, this was done to clarify that plastic composite handrails need to comply with R312 and R507.2.2, not just R507.2.2.

This code change clarifies and consolidates the handrail requirements under one area within the code and we believe simplifies the code by removing all the duplications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal consolidates duplicate information spread out over many sections and rearranges the provisions into one logical section. There is only one slight technical change is section R312.3, which I believe does not increase cost, as the same pre-manufactured handrail bracket materials are used on stairs as ramps, and stairs have the requirement already in place. Except for this one technical change the rest of the content is just editorial and rearrangement of the text into a more logical order and therefore, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee favored this reorganization and consolidation of the handrail requirements. This also added some additional needed language and appropriate pointers. This proposal aligns with IBC egress format. (Vote 8-2)

Final Hearing Results

RB110-22 AS

RB111-22

Original Proposal

IRC: R311.7.8.4, R311.8.3.3

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

2021 International Residential Code

Revise as follows:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward or terminate at a post, wall, guard, walking surface, or wrap continuous to itself ~~or terminate to a post~~. The end of the handrail shall not form a gap more than 1/4 inch (6.4 mm) from the adjacent surface.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

R311.8.3.3 Continuity. *Handrails* where required on *ramps* shall be continuous for the full length of the *ramp*. *Handrail* ends shall be returned toward or shall terminate ~~in~~ at ~~newel posts or safety terminals~~ a post, wall , guard, walking surface, or wrap continuous to itself. The end of the handrail shall not form a gap more than 1/4 inch (6.4 mm) from the adjacent surface. *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.

Reason: In addition to providing for a continuous handrail the intent of this section has been to restrict open handrails such that they do not snag loose clothing or objects carried that might cause an accidental fall. In the last cycle we worked with others to successfully eliminate the term safety terminal that had been open to wide interpretation. In doing so we tried to better define what should be considered safe terminations of the end of the handrail. This change clarifies that a handrail can terminate at any of the described surfaces not just a post as well as be returned toward all these same surfaces. In the added sentence we have included a limitation for any gap that might be formed between the end of the handrail and the adjacent surface when handrails are returned *toward* a surface to maintain the intent to restrict the possibility of snagging loose clothing or carried objects.
ICC staff pointed out that the term safety terminal still remained in the ramp section under continuity and requested we address this in this cycle. This proposal does so and if passed both sections will have parallel language.

This proposal provides needed clarification for interpretation and enforcement of handrail terminations on both stairs and ramps.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal follows the original intent of the provisions for handrail extensions and provides additional information on what is required to meet that intent, however, there are no technical changes to the requirements that will result in an increase in cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward or terminate at a post, wall, guard, walking surface, or wrap continuous to itself. ~~The end of the handrail~~Handrail returns shall not form a gap more than 1/4 inch (6.4 mm) from the adjacent wall~~surface~~.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

R311.8.3.3Continuity. *Handrails* where required on *ramps* shall be continuous for the full length of the*ramp*. *Handrail* ends shall be returned toward or shall terminate at a post, wall , guard, walking surface, or wrap continuous to itself. ~~The end of the handrail~~Handrail returns shall not form a gap more than 1/4 inch (6.4 mm) from the adjacentwall~~surface~~. *Handrails* adjacent to a wall shall have a space of not less than $1^1/_2$ inches (38 mm) between the wall and the *handrails*.

Committee Reason: The modification for the last sentence ins Sections R311.7.8.4 and R311.8.3.3 provided more consistent terminology. The committee concluded this proposal as modified helps minimize the chance of accidental falls by snagging clothes on handrails ends. (Vote: 10-0)

Final Hearing Results	
RB111-22	AM

RB112-22

Original Proposal

IRC: R311.7.8.4

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

2021 International Residential Code

SECTION R311 MEANS OF EGRESS

Revise as follows:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top~~riser~~ <u>nosing</u> of the flight to a point directly above the lowest ~~riser~~<u>nosing</u> of the flight. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

Reason: With the addition of the defined term nosing in both the IRC and IBC the use of "riser" for the vertical and horizontal intersection point of the lowest tread edge and top landing edge is no longer correct and the correct term is nosing. This term and measuring point were changed in the Part A cycle and will be the point of measurement where handrail extensions are to be measured from in the 2024 IBC. Keeping the terminology, the same in both codes will prevent confusion within the industry as adoption of the newest model codes are done over time.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial reorganization of two defined terms within the requirement to the more appropriate term and does not change any technical requirements that will increase or decrease cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the~~top~~ nosing of the <u>landing at the top of the</u> flight to a point directly above the lowest nosing of the flight. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

Committee Reason: This modification is an important clarification for the reference point for the handrail continuity at the top of the flight. The committee concluded this proposal as modified clarifies the reference point for the handrail continuity at both ends of the flight. (Vote 9-0)

Final Hearing Results

RB112-22	AM

RB113-22

Original Proposal

IRC: R311.7.8.4

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

2021 International Residential Code

Revise as follows:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward a wall, guard, walking surface, continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the topor bottom landings ~~landing~~.

Reason: Exception 2 for volutes, turnouts and starting easing's, added terminating over the top landing allowed. However, it left out bottom landings for volutes, turnouts and starting easing's. This proposal adds the clarification to the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is adding minimal technical clarification which was removed with the deletion of the generalized term "Safety Termination" last model 2021 IRC publication within the code and just reaffirming an implied allowance which will not increase or decrease cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward a wall, guard, walking surface, continuous to itself, or terminate to a post.

Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest trea~~dand over the top or bottom landings~~ .

Committee Reason: The modification to remove the landing for Section R311.7.8.4 Exception 2 is appropriate because the requirements for the stairway handrails are only from top nosing to the bottom nosing - so this does not include the bottom landing. Therefore in clarifies the current intent of the code. The committee concluded this proposal as modified clarifies that this removed redundant language and clarifies that the volute at the bottom of the stairway is over the bottom riser and not over the landing. (Vote 9-0)

Final Hearing Results

RB113-22 AM

RB114-22

Original Proposal

IRC: R311.7.9 (New), R311.7.9.1 (New), R311.7.9.2 (New), R311.7.9.3 (New), R311.7.9.4 (New), AJ109.8, AJ109.8.1, AJ109.8.2, AJ109.8.3

Proponents: Ardel Jala, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, Seattle Department of Construction & Inspections, Seattle Department of Construction & Inspections (micah.chappell@seattle.gov)

2021 International Residential Code

Add new text as follows:

R311.7.9 Stairways in existing buildings. Where an existing stair is completely reconstructed or an existing stair serves*habitable space* created by a *change of occupancy*, the stairs shall comply with the requirements of this code for new construction. Alterations to existing stairs shall comply with the Sections R311.7.8 and R311.7.9.1 through R311.7.9.4.

R311.7.9.1 Stair width.
Existing stairs not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.

R311.7.9.2 Stair headroom.
Headroom height on existing stairs being altered or modified shall not be reduced below the existing*stairway* finished headroom. Existing stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

R311.7.9.3 Stair landing. Landings serving existing stairs being altered or modified shall not be reduced below the existing*stairway* landing depth and width. Existing stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

R311.7.9.4 Stair treads and risers. An existing stairway shall not be required to comply with Section R311.7.5 wherethe existing space and construction does not allow a reduction in pitch or slope. Where *risers* are added to an existing stair, the tread and riser dimensions of the added *risers* shall match the existing stair.

Revise as follows:

~~**AJ109.8 Stairs.**~~ .

Delete without substitution:

~~**AJ109.8.1 Stair width.** Existing *basement* stairs and *handrails* not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.~~

~~**AJ109.8.2 Stair headroom.** Headroom height on existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current finished headroom.~~

~~**AJ109.8.3 Stair landing.** Landings serving existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.~~

Reason: This is one of (4) proposals that pull existing "breaks" found in Appendix J for Existing Buildings into the main body of the code. Each proposal permits flexibility from meeting full code compliance for existing construction while maintaining a reasonable level of safety.

This proposal creates a new section for existing stairs that incorporates provisions from Section AJ109.8 into the main body of the code and aligns the IRC existing stair requirements with flexibility currently found in IEBC. The proposal provides breaks on full compliance for stair width, headroom and landings for alterations to existing stairs. The proposal also gives a break for stair treads and risers that is consistent with a more general break for existing stairs in IEBC Section 506.3.

Alterations, repairs, and reconfiguration of spaces often require altering, extending or completely rebuilding the existing stairs. However, existing stairs may not conform to current code though they were compliant at the time they were built. For example, legacy codes permitted a residential stair to have an 8 inch riser and a 9 inch tread versus today's rise/run requirements of 7 3/4 inches and 10 inches. Reducing the pitch to make the stair comply requires enlarging the stair footprint. It can be impractical to reframe the stair opening or reconfigure the floor plan where the existing space and construction does not easily accommodate a larger stair footprint.

In this proposal, alterations to existing stairs are permitted some flexibility. Existing stairs not being altered are allowed to remain as existing non-conforming. Sections R311.7.9.1 through R311.7.9.3 brings the code provisions from Appendix J Sections AJ109.8.1 through AJ109.8.3 into the main body of the code and deletes them from Appendix J. These sections state that stair width, headroom, and landing shall not be made more non-conforming but otherwise are permitted to maintain their current dimensions. While the breaks in Appendix J apply to existing basement stairs only, these allowances seemed reasonable to extend to all existing stairs.

Section R311.7.9.4 of this proposal applies to stair treads and risers in existing buildings. This section is based on IEBC Section 506.3 which permits a stair to not comply with new stair provisions when the existing space does not permit the reduced pitch or slope. In the proposal, I did not copy the IEBC language over in its entirety because the other sections of this proposal already provide breaks on stair width, headroom and landing. For clarity, I revised the IEBC language to apply to the tread and riser requirements for the existing stairs.

Section R311.7.9.4 also adds an allowance to match the tread and riser dimensions of an existing stair when extending the run of a stair. This allows an owner to extend an existing stair that has an 8 inch rise and 9 inch tread to be extended with risers that match the existing rise and run and that do not create a tripping hazard by a reduction in pitch mid-run.

Section R311.7.9 makes it clear that when a stair in an existing building is completely rebuilt, those stairs must be made fully compliant. For example, an existing stair is demolished and a new stair constructed as part of alterations. This should be regulated as a new stair as this is an opportunity for the stair to be built compliant to current code.

Section R3117.9 also makes it clear that when a stair is serving an area where a change of occupancy creates habitable space, that the existing stair must be made fully compliant. This requirement is consistent with Section R102.7.1 which states the alterations shall not cause an existing structure to become less compliant.

In summary, while Section R104.10 allows the building official discretion to offer flexibility where full compliance is not practical, the code does not provide explicit relief from full compliance with new code requirements for alterations to existing stairs. This proposal clarifies when full compliance is required and provides flexibility from full code compliance for alterations to an existing stair. This proposal provides greater flexibility for existing stair code compliance to homeowners wanting to maximize the usable square footage in their home.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal reduces the extent that an existing stair must be altered to meet new code requirements for an existing building that falls under the scoping of the IRC. With this additional flexibility explicitly stated in the code it eliminates the need for reframing floor openings to accommodate larger stairs to meet current code, resulting in a savings in construction cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R311.7.9 Stairways in existing buildings. ~~Where an existing stair is completely reconstructed or an existing stair serves *habitable space* created by a *change of occupancy*, the stairs shall comply with the requirements of this code for new construction. Alterations to existing stairs shall comply with the Sections R311.7.8 and R311.7.9.1 through R311.7.9.4.~~ <u>Alterations to existing stairs shall not be</u>

required to comply with the requirements of this code where the existing space and construction does not allow a reduction in pitch or slope.

~~**R311.7.9.1 Stair width**. Existing stairs not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.~~

~~**R311.7.9.2 Stair headroom.** Headroom height on existing stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing stairs not otherwise being altered shall be permitted to maintain the current finished headroom.~~

~~**R311.7.9.3 Stair landing.** Landings serving existing stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.~~

~~**R311.7.9.4 Stair treads and risers.** An existing stairway shall not be required to comply with Section R311.7.5 where the existing space and construction does not allow a reduction in pitch or slope. Where *risers* are added to an existing stair, the tread and riser dimensions of the added *risers* shall match the existing stair.~~

AJ109.8 Stairs.
AJ109.8.1 Stair width. Existing *basement* stairs and *handrails* not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.

AJ109.8.2 Stair headroom. Headroom height on existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

AJ109.8.3 Stair landing. Landings serving existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

Committee Reason: The modification reinstates what was being taken out of Appendix J, AJ109.8.1 through AJ109.8.3, so options for stairs are not lost in the appendix. The committee requested that the title for the section in AJ109.8 also be restored. The modification to the new proposal Sections R311.7.9 through R311.7.9.4, removed the language moved into the text from the appendix and replaced it with a one sentence allowance for existing stairways. This allowance is consistent with IEBC. This proposal as modified now gives the break for pitch and slope in existing buildings based on current conditions. (Vote 10-0)

Final Hearing Results

RB114-22	AM

RB121-22

Original Proposal

IRC: R314.1, R314.3.1

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

2021 International Residential Code

SECTION R314
SMOKE ALARMS

Revise as follows:

R314.1 General. Smoke alarms shall comply with NFPA 72, ~~and~~ Section R314 <u>and the manufacturer's installation instructions</u> .

R314.1.1 Listings. Smoke alarms shall be *listed* in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be *listed* in accordance with UL 217 and UL 2034.

Revise as follows:

R314.3.1 Installation near cooking appliances. Smoke alarms shall ~~not~~ be installed <u>a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance.</u> ~~in the following locations unless this would prevent placement of a smoke alarm in a location required by Section R314.3.~~

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 (1828 mm) horizontally from a permanently installed cooking *appliance*.~~
4. ~~Smoke alarms *listed* and marked "helps reduce cooking nuisance alarms" shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking *appliance*.~~

<u>**Exception:** Smoke alarms shall be permitted to be installed a minimum of 6 ft. (1.8 m) horizontally from a permanently installed cooking appliance where necessary to comply with Section R314.3.</u>

Reason: This change correlates the IRC requirements for smoke alarms with the changes to the IFC and IPMC as approved by F89-21. This proposal simply aligns the code requirements in the I-Codes 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 IRC is 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 the 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 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 simply aligns the IRC with NFPA 72 and UL 217. Since this is already required by the standards, this change to the code will not change the technical requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal removes outdated requirements and takes into consideration new technologies and advancements for smoke alarms. (Vote 10-0)

Final Hearing Results

RB121-22	AS

RB122-22

Original Proposal

IRC: R314.1.1, R314.1.2 (New)
Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

R314.1.1 Listings. Smoke alarms shall be *listed* and *labeled* in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be *listed* in accordance with UL 217 and UL 2034.

Add new text as follows:

R314.1.2 Installation. Smoke alarms shall be installed in accordance with their listing and the manufacturer's instructions.

Reason: This proposal adds requirement for these devices to be listed and labeled, since listed alarms will include a listing mark (label). It also requires smoke alarms to be installed in accordance with the listing and the manufacturer's installation instructions. "Listed" and "Labeled" are both defined terms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Listed smoke alarms are already identified by a label, and there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R314.1.1 Listings. Smoke alarms shall be *listed* and *labeled* in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be *listed* and *labeled* in accordance with UL 217 and UL 2034.

Committee Reason: The committee felt that the modification adding "and labeled" to the 2nd sentence of Section 314.1.1 is important for the combination smoke and carbon monoxide alarms - and would be consistent with the rest of the proposal.The committee concluded this proposal as modified is an improvement for the installation requirements for the alarms. The committee would like to see combination smoke and carbon monoxide alarms added to the installation Section R314.1.2 through public comment. See also RB124-22. (Vote 10-0)

Public Comments

Public Comment 1

Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com) requests As Modified by Public Comment

Further modify as follows:

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R314.1.2 Installation. Smoke alarms and combination smoke and carbon monoxide alarms shall be installed in accordance with their listing and the manufacturer's instructions.

Commenter's Reason: This proposal adds the requirement for combination smoke and carbon monoxide alarms to be installed in accordance with the listing and the manufacturer's installation instructions. The same requirement currently exists for smoke alarms, and this expands the requirement to include combination alarms as well similar to what was done in RB124-22.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Listed smoke alarms and combination smoke and carbon monoxide alarms are already being installed in the same fashion so there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

Final Hearing Results

RB122-22	AMPC1

RB124-22

Original Proposal

IRC: R315.1.1, R315.1.2 (New)

Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

R315.1.1 Listings. Carbon monoxide alarms shall be *listed* and *labeled* in accordance with UL 2034. Combination carbon monoxide and smoke alarms shall be *listed* and *labeled* in accordance with UL 2034 and UL 217.

Add new text as follows:

R315.1.2 Installation. Carbon monoxide alarms shall be installed in accordance with their*listing* and the manufacturer's instructions.

Reason: This proposal adds requirement for these devices to be listed and labeled, since listed alarms will include a listing mark (label). It also requires CO alarms to be installed in accordance with the listing and the manufacturer's installation instructions. "Listed" and "Labeled" are both defined terms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Listed carbon monoxide alarms are already identified by a label, and there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

Public Hearing Results

Committee Action	**As Modified**

Committee Modification:

R315.1.2 Installation. Carbon monoxide alarms, and combination carbon monoxide and smoke alarms, shall be installed in accordance with their *listing* and the manufacturer's instructions.

Committee Reason: The modification to Section R315.1.2 added combination carbon monoxide/smoke alarms to the installation requirements. This is consistent with the committee recommendation for RB122-22 and would coordinate with the two types of systems addressed in Section R315.1.1. The committee approved this proposal as modified for consistency with committee's action on RB122-22 and ensure the proper installation of carbon monoxide alarms and combination carbon monoxide/smoke alarms. (Vote: 10-0)

Final Hearing Results

RB124-22	AM

RB125-22

Original Proposal

IRC: R315.7.1, R315.7.2, NFPA Chapter 44

Proponents: John Swanson, National Fire Sprinkler Association, National Fire Sprinkler Association (swanson@nfsa.org)

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Revise as follows:

R315.7.1 General. Household carbon monoxide detection systems shall comply with NFPA ~~720~~ 72. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

R315.7.2 Location. Carbon monoxide detectors shall be installed in the locations specified in Section R315.3. These locations supersede the locations specified in NFPA ~~720~~ 72.

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) Detectors and Warning Equipment~~

Reason: NFPA 720 has been discontinued after the 2015 edition. All carbon monoxide alarm and detection criteria has been relocated and is now addressed in NFPA 72.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no technical changes to this code section. This proposal is being made to clarify the NFPA standard now addressing carbon monoxide alarms/detection equipment.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal because it incorporates the replacement of a discontinued standard, NFPA 720, for the correct one, NFPA 72. (Vote: 10-0)

Final Hearing Results

RB125-22 AS

RB126-22

Original Proposal

IRC: SECTION R111.1, R111.2, R111.3

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

2021 International Residential Code

SECTION R111
SERVICE UTILITIES

Revise as follows:

R111.1 Connection of service utilities. A *person* shall not make connections from a utility, a source of energy, fuel, ~~or~~ power, or 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*.

R111.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, ~~or~~ power, or the water system or sewer system for the purpose of testing systems for use under a temporary approval.

R111.3 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 ~~set forth in Section R102.4~~ 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 R111.1 or R111.2. The *building official* shall notify the serving utility and where 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 disconnection, the *owner*, 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: ADM39-19 was a 2 part proposal. The revised text for service utilities was approved for IBC, IPC, IMC, IFGC, IEBC, IPSDC, IWUIC, ISPSC. The reason for disapproval by the IRC code development committee was "This would be in violation of the requirements of many public utilities across the country. (Vote 6-4)."
The BCAC respectively disagrees with the IRC development committee. The code official is not making the connection or disconnection, he just has the power to approve it were warranted. This is not over riding the public utility companies.

The main purpose of this proposal is coordination IRC with the other codes for the section on connection to services – including those coming from utilities or generated on-site

· R111.3 - Codes have references to codes and standards throughout the document, so a reference back to the list at the beginning of Chapter 1 is not inclusive.

· R111.1 and R111.2 - The list should include all the systems –including water and sewer.

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). 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 is an editorial change that provides consistency between I-codes. This is an administrative provision that provides options for code officials for system testing and response in emergencies. Delays in waiting for a response from utilities could be costly.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal because it will provide consistency between the I-codes and as a clean up of the administrative provisions for Service Utilities. (Vote 9-1)

Final Hearing Results

RB126-22	AS

RB127-22

Original Proposal

IRC: SECTION R316.1.1 (New), R316.1.2 (New), TABLE R316.1.2 (New), ICC Chapter 44 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

SECTION R316
FOAM PLASTIC

R316.1 General. The provisions of this section shall govern the materials, design, application, construction and installation of foam plastic materials.

Add new text as follows:

R316.1.1 Spray-applied foam plastic. Single- and multiple-component spray-applied foam plastic insulation shall comply with the provisions of Section R316 and ICC 1100.

R316.1.2 Insulating sheathing. Foam plastic materials used as *insulating sheathing* shall comply with the provisions of Section R316 and the material standards in Table R316.1.2.

TABLE R316.1.2 MATERIAL STANDARDS FOR FOAM PLASTIC INSULATING SHEATHING

Expanded Polystyrene (EPS)	ASTM C578
Extruded Polystyrene (XPS)	ASTM C578
Polyisocyanurate	ASTM C1289

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

1100-2018 Standard for Spray-applied Foam Plastic Insulation

Reason: This proposal provides references to applicable standards that govern material characteristics in addition to the requirements in Section R316. This proposal also coordinates with identical provisions in the 2021 IBC Section 2603.1 including revisions that were approved as submitted by FS152-21 for the 2024 IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal consolidates reference material standards that are applicable to foam plastic materials already addressed in the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal establishes the minimum physical and performance properties as well as application requirements for spray applied foam plastics. It also fills a void by provides material standards for spray foam and plastics. (Vote: 10-0)

Final Hearing Results	
RB127-22	AS

RB129-22

Original Proposal

IRC: R316.6

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Revise as follows:

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following *approved* tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715, ~~or fire tests related to actual end-use configurations~~. Approval shall be based ona large-scale test reflecting the actual end-use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use. 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: This change correlates with a change made to the IBC by F60-21, Part II, which eliminated a loophole in the IBC that permitted creative testing of foam plastics without use of controls in Chapter 1 that are applicable to every other case where someone would want to propose an alternative method or material. 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 cited in the code text and additional options developed by evaluation services that can be considered as alternative methods under Chapter 1. Continuing to maintain "loose" text in this section that circumvents Chapter 1 is unjustified. If the general alternative methods provisions are good enough for everything else in the code, there is no reason for foam plastics to be treated differently. The technical committee agreed with this in Group A (vote 13-0), and the members rejected a public comment asking for that action to be overturned and upheld the committee in the OGCV.

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 had been approved based on non-standard tests would have to be retested.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal was disapproved because it eliminates a fire test option for compliance and the committee feels a large scale test is excessive for small applications that happen with residential. This requirement could actually increase costs. Some of the committee supported the proposal for its correlation with the the IBC and approved proposal F60-21 n Group A. The committee recommended that the proponents of RB129-22 and RB130-22 work together. (Vote: 6-5)

Public Comments

Public Comment 1

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

Modify as follows:

2021 International Residential Code

R316.6 Specific approval. Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of ~~one of the following *approved* tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715,. Approval shall be based on a~~ an *approved* large-scale test reflecting the actual end-use configuration and~~shall be~~ performed on the finished foam plastic assembly in the maximum thickness intended for use. 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. The *approved* large-scale test shall comply with one of the following: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715.

Commenter's Reason: There was significant support (a vote of 6:5) for this proposal in its original form. But rather than simply ask for APPROVAL AS SUBMITTED, this public comment seeks to address some of the opponent concerns expressed at the Rochester hearing. Primary opposition to the original proposal has related to the question of whether the text might have been read to require more than one test. This revision makes it clear that a only a single test is required. Regarding the committee statement suggesting that large scale tests might be excessive for residential applications, I've not heard any previous suggestions that we should be looking to permit foam plastics to skirt large scale testing. Would we now be looking for two approval levels for foam plastics that differ between residential and commercial applications? It is widely agreed by industry and the fire service that foam plastics need sufficient testing and approvals to ensure safe use in the built environment, both residential and commercial. This proposal sought to maintain that intent by ensuring that foam plastics that don't meet the prescriptive provisions of the code in R316 must go through the normal alternative method process for a thorough evaluation of equivalency.

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 is consistent with the intent of the original proposal.

Final Hearing Results	
RB129-22	AMPC1

RB131-22

Original Proposal

IRC: R316.8

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R316.8 Wind resistance. Foam plastic insulation complying with ASTM C578 and ASTM C1289 and used as exterior wall sheathing on framed wall assemblies shall comply with SBCA FS 100 for wind pressure resistance unless installed directly over <u>or under</u> a sheathing material that is separately capable of resisting the wind load or otherwise exempted from the scope of SBCA FS 100.

Reason: This proposal adds “under” sheathing which is another method by which foam sheathing is installed with structural sheathing materials that are separately capable of resisting the wind load. This addresses an omission when Section R316.8 was first brought into the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an option for installation of foam sheathing to resist wind load and will not increase cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that this proposal recognizes an application of foam plastic insulation to resist wind loads and recognized new material and different systems. This also correlates with FS100-21. Some of the committee was concerned this proposal has some structural sheathing issues for supporting loads to meet the standard. (Vote 6-5)

Final Hearing Results

RB131-22	AS

RB133-22

Original Proposal

IRC: R317.3, ASTM Chapter 44

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R317.3 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 wood and fire-retardant-treated wood shall be in accordance with this section. 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 (1 oz / ft²) or ASTM A641 Class 3S (1 oz / ft²). Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~–09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: 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./ft². 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/ft².
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.

Bibliography: ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples
ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Nails have been made by both methods for a very long time. This just formalizes what is/has been done and will not add cost to construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal provides alternative methods of compliance and would strengthen the availability of certain products on the market. This proposal also updates the Standard of the ASTM testing. (Vote: 10-0)

Final Hearing Results

RB133-22 AS

RB134-22

Original Proposal

IRC: SECTION R320.1, R320.3(New)

Proponents: Marsha Mazz, United Spinal Association (mmazz@accessibility-services.com)

2021 International Residential Code

SECTION R320 ACCESSIBILITY

Revise as follows:

R320.1 ~~Scope~~ Dwelling units or sleeping units. Where there are four or more *dwelling units* or *sleeping units* in a single structure, the provisions of Chapter 11 of the International Building Code for Group R-3 shall apply.

Exception: Owner-occupied *lodging houses* with five or fewer guestrooms are not required to be accessible.

R320.2 Live/work units. In *live/work units,* the nonresidential portion shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a structure where there are four or more *live/work units,* the dwelling portion of the *live/work unit* shall comply with Section 1108.6.2.1 of the *International Building Code*.

Add new text as follows:

R320.3 Care facilities. Where care facilities are permitted to be constructed in accordance with this code, the portions of the dwelling used to operate a business providing care shall be accessible in accordance with Chapter 11 of the International Building Code.

Reason: The Department of Justice Americans with Disabilities Act (ADA) regulations require home businesses that are defined as "public accommodations" or "commercial facilities" to be accessible. Care facilities would be defined under the ADA as public accommodations, either Category #6 (a service establishment) or Category #11 (a day care center, senior citizen center, homeless shelter, or other social service center establishment). Areas of the home that are not part of a public accommodation or commercial facility are not required to be accessible. A link to these requirements is included in the bibliography. The only exception to these ADA requirements is reflected in Exception #1 to Section R101.2 and the Exception to R320.1 for owner-occupied transient lodging facilities.

Change to the title of R320.1

Section R320.1 does not limit application of subsequent sections e.g., R320.2 because these sections have equal weight (i.e., one is not a subsection of the other). For this reason, the title “Scope” is misleading in that it does not establish the scope of the entire section. We elected to use the title “Dwelling units or sleeping units” because it describes the units covered by the provision and coordinates well with the titles of the subsequent section(s).

New R320.2

We have elected to describe the non-residential portion of the dwellings as a "business" operated to

provide care. We have done this so as not to net-up facilities where people elect to co-cohabitate and share resources such as care givers, as with a family that does not provide care to applicants that are members of the public. Such an arrangement would not fall into the DOJ category of "public accommodation" because it is not a business with services available to the public.

Consistent with the ADA, we have proposed to require only those portions of one- and two-family dwellings used to provide care to comply with Chapter 11 of the International Building Code. New construction and alterations to portions of the dwelling unit or single-family dwelling that are not part of the care facility are outside the scope of the IBC and would not be required to be accessible.

It has been argued that the facilities addressed in proposed new Section R320.3 Care facilities are live/work units addressed in Section

R320.2. While we agree that a care facility could be constructed as a live/work unit, the IRC does not require this. Exceptions 3, 4, and 5 to Section R101.2 Scope permit certain types of care facilities to comply with the IRC provided they have an automatic sprinkler system. Exceptions 3, 4, and 5 do not require compliance with IBC Section 508.5 as does Exception 1. Furthermore, Exception #1 only addresses live/work units located in "townhouses" which are unlikely to include care facilities of any type. IBC Section 508.5.1 imposes a number of limitations on live/work units not imposed by the IRC on the care facilities addressed by Section R101.2 including: a 3,000 square foot max. limitation where the nonresidential portion is not greater than 50 percent of the overall area; location of the non-residential portion on the "first" or "main" floor; and, no more than five non-residential workers or employees can occupy the non-residential area(s).

Exceptions 3, 4 and 5 to Section R102.1 appear to exempt care facilities for five or fewer persons without any of the limitations applicable to live/work units and, more importantly, without reference IBC Sections 508.5.9 Accessibility (for live/work units) or Chapter 11, including Section 1108.6.2.1 also requiring accessibility to the non-residential portions of a live/work unit. This proposal remedies this inconsistency with the Americans with Disabilities Act.

Bibliography: See 28 CFR 36.207 Places of public accommodation located in a private residence; 28 CFR 36.401(b) Commercial facilities located in a private residence; and the definition of "place of public accommodation" at 28 CFR 36.104. All are available at https://www.ada.gov/regs2010/titleIII_2010/titleIII_2010_regulations.htm.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Under the ADA, when someone designs or constructs a private home containing a public accommodation or commercial facility, the portions of the home used for the public accommodation or commercial facility must be accessible. Similarly, if a home is altered to include a public accommodation or commercial facility, the alteration must comply with the ADA Standards unless technically infeasible. Consequently, these facilities are covered by federal law and failure to comply with the federal law has a potential cost to the owner, operator, and individuals involved in the design and construction of such facilities.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R320.3 Care facilities. Where care facilities are permitted to be constructed in accordance with~~this code~~ Section R101.2, the portions of the dwelling used to operate a business providing care shall be accessible in accordance with Chapter 11 of the International Building Code.

Committee Reason: The modification to Section R320.3 provides a more precise reference to the scope of the IRC. This isprecedence in the IRC for those areas that are not specifically part of the dwelling unit, but are used for business applications (e.g. for live/work units or day care), to be in compliance with Chapter 11 of the IBC. The committee also felt that care facilities should have the accessibility standards present. (Vote: 10-0)

Final Hearing Results

RB134-22 AM

RB135-22

Original Proposal

IRC: SECTION R321.1.1 (New), R321.1.1.1 (New), R321.1.1.2 (New)

Proponents: Kevin Brinkman, National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Residential Code

SECTION R321
ELEVATORS AND PLATFORM LIFTS

R321.1 Elevators. Where provided, passenger elevators, limited-use and limited-application elevators or private residence elevators shall comply with ASME A17.1/CSA B44.

Add new text as follows:

R321.1.1 Private Residence Elevators. The design, construction, and installation of private residence elevators installed within a residential unit or providing access to one individual dwelling unit shall conform to ASME A17.1/CSA B44, Section 5.3.

R321.1.1.1 Hoistway Enclosures.. Hoistway enclosures for private residence elevators shall comply with ASME A17.1/CSA B44, Requirement 5.3.1.1

R321.1.1.2 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.

R321.2 Platform lifts. Where provided, platform lifts shall comply with ASME A18.1.

R321.3 Accessibility. Elevators or platform lifts that are part of an accessible route required by Chapter 11 of the International Building Code, shall comply with ICC A117.1.

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 to the 0.75 inch requirement, 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 A17.1/B44.

The proposed changes are consistent with similar changes approved for Chapter 30 of the IBC during the Group A hearings.

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 Submitted**

Committee Reason: The committee concluded this proposal coordinates with IBC and also provides users of the IRC pointers for application where elevators may be installed. (Vote: 9-1)

Final Hearing Results

RB135-22	AS

RB137-22

Original Proposal

IRC: R322.2.1, R322.3.2

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 Residential Code

Revise as follows:

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas, not including flood hazard areas designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including*basement*) elevated to a height above the highest adjacent *grade* of not less than the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or not less than 3 feet (915 mm) if a depth number is not specified.
3. *Basement* floors that are below*grade* on all sides shall be elevated to or above base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
4. Attached garages and carports ~~Garage and carport floors~~ shall comply with one of the following:
   4.1. ~~They~~ The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.
   4.2. ~~They~~ The floors shall be at or above *grade* on not less than one side. Where~~a~~an attached garage or carport is enclosed by walls, the walls shall have flood openings that comply with Section R322.2.2 andthe attached garage or carport shall be used solely for parking, building access or storage.
5. Detached accessory structures and detached garages shall comply with either of the following:
   5.1. The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.
   5.2. The floors are permitted below the elevations required in Item 1 or Item 2, as applicable, provided such detached structures comply with all of the following:
      5.2.1. Are used solely for parking or storage.
      5.2.2. Are one story and not larger than 600 square feet (55.75 m^2).
      5.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.
      5.2.4. Have flood openings that comply with Section R322.2.2.
      5.2.5. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.
      5.2.6. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.

Exception: Enclosed areas below the elevation required in this section, including *basements* with floors that are not below*grade* on all sides, shall meet the requirements of Section R322.2.2.

R322.3.2 Elevation requirements.

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher.

2. *Basement* floors that are below*grade* on all sides are prohibited.

3. Attached garages ~~Garages~~ used solely for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above *grade* on not less than one side and, if enclosed with walls, such walls shall comply with Item~~6~~ 7.

4. Detached accessory structures and detached garages shall comply with either of the following:
   4.1. The bottom of the lowest horizontal structural member supporting the floors shall be elevated to or above the elevation required in Item 1.

   4.2. The floors are permitted below the elevations required in Item 1, provided such detached structures comply with all of the following:
      4.2.1. Are used solely for parking or storage.

      4.2.2. Are one story and not larger than 100 square feet (9.29 m^2).

      4.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.

      4.2.4. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.

      4.2.5. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.

~~4.~~5. The use of fill for structural support is prohibited.

~~5.~~6. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

~~6.~~7. Walls and partitions enclosing areas below the elevation required in this section shall meet the requirements of Sections R322.3.5 and R322.3.6.

Reason: The regulations of the National Flood Insurance Program require all structures to be elevated or dry floodproofed (nonresidential only). The regulations do not explicitly address accessory structures and detached garages. 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.
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). FEMA expects to reissue Technical Bulletin 7 in early 2022, revised to be consistent with the policy.

The proposal adds provisions to the elevation requirements of Section R322, Flood-Resistant Construction, specifically to allow wet floodproofed accessory structures and detached garages in flood hazard areas with floors below the required lowest floor elevations. The IRC Section 105.2 states that accessory structures smaller than 200 square feet are exempt from permits but must not “be done in any manner in violation” of the code. Therefore, strictly read, accessory structures in flood hazard areas must be fully elevated or dry floodproofed. This proposal provides some relief to full compliance by allowing some accessory structures to be wet floodproofed (based on size). The proposal also modifies the requirements of R322.2.1 and R322.3.2 to apply to attached garages, with no size limits. Note that for floodplain management purposes, enclosures under elevated buildings used solely for parking, storage and building access are enclosures, not garages.

The proposal specifies that detached accessory structures and detached garages are allowed below the elevations required for other structures (or without dry floodproofing in Zone A/AE) if wet floodproofed and:·

- In flood hazard areas other than coastal high hazard areas, the structures are one-story and not larger than 600 sq. ft. (approximately a two-car garage). Detached garages and accessory structures larger than the size limit are allowed if elevated and otherwise comply with the requirements or if dry floodproofed (treated as nonresidential), or if communities authorize them by variance. Note that Section R403.1.4.1 does not require footings for “free-standing accessory structures with an area of 600 square feet or less, of light-frame construction” to extend meet the frost protection requirements.

- In coastal high hazard areas (Zone V), the structures are not larger than 100 sq. ft. Note that breakaway walls and flood openings are not required. Detached accessory structures larger than the size limit are allowed if elevated and otherwise comply with the requirements, or if communities authorize 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
Costs for many detached accessory structures will decrease because they will no longer be required to be elevated or dry floodproofed when they are smaller than the specified limits, and there are cost savings because communities will not be expected to approve non-elevated accessory structures by variance. The code change proposal limits the size of detached accessory structures and detached garages that can be wet floodproofed rather than elevated or dry floodproofed. 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 larger the size, the more costly would be the losses resulting from flooding. 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 estimated that for elevating a single-family home, the cost is $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 **Disapproved**

Committee Reason: The committee was in support of the general idea, but felt the issue of the the size of the garage did not seem vetted out completely. The 100 square feet seems really low where the IRC doesn't require permits until 200 square feet. (Vote: 10-0)

Public Comments

Public Comment 1

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov) requests As Submitted

Commenter's Reason: Including the proposed requirements in the IRC will mean thousands of communities that participate in the NFIP will conform to the policy and bulletin issued by FEMA regarding wet floodproofed (non-elevated) accessory structures. It is only by FEMA policy that accessory structures smaller than specified sizes are not required to be elevated or dry floodproofed. The size limit is 100 sq ft for detached accessory structures in coastal high hazard areas (Zone V, where wave heights are 3 feet and higher) and Coastal A Zones (wave heights between 3 and 1.5 feet), and the size limit is one-story, 600 sq ft for detached garages and accessory structures in all other flood hazard areas.
The committee questioned the 100 sq ft size limit established by FEMA for Zone V, in part because the IRC doesn't require permits for accessory structures that are less than 200 sq ft. However, even though permits are not required, compliance is required because accessory structures smaller than 200 square feet are exempt from permits must not "be done in any manner in violation" of the code. Including the proposed requirements for accessory structures establishes how accessory structures can be allowed and not violate the code. Without this proposal, 100-sq ft accessory structures in Zone V would have to be fully elevated.

The 100 sq. ft. size limit for Zone V and Coastal A Zone is consistent with FEMA guidance and letters of interpretation issued to communities since the mid-1980s. The first NFIP Technical Bulletin 5 on the NFIP free-of-obstruction requirements for Zone V was issued in 1993. It stated the following:

> *"Unless properly elevated on piles or columns in accordance with Section 60.3(e)(4), accessory buildings in V zones must be limited to low-value or small structures such as small metal or wooden sheds that are "disposable." If a low-cost or small building is placed on a site, consideration must be given to the effects the debris from the building will have on the building or adjacent buildings. If the building is of significant size and strength to create either a debris impact or flow diversion problem, it must be elevated in accordance with Section 60.3(e)(4)."*
>
> *"For purposes of defining and administering the floodplain ordinance, if a community wishes to allow unelevated accessory buildings, the community must establish the meaning of low-cost and small accessory buildings. FEMA recommends that low cost be defined as having a value of less than $500 and small be defined as less than 100 square feet of floor space. Accessory buildings meeting these criteria must be unfinished on the interior, constructed with flood-resistant materials below the BFE, and used only for storage. Unless properly elevated on piles or columns in accordance with Section 60.3(e)(4), detached garages are not allowed in V zones."*

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The public comment does not impact the cost of the code change proposal. Therefore, the net effect of the public comment and code change proposal is equal to the cost impact of the code change proposal. No additional cost impact comments.

Final Hearing Results

RB137-22	AS

RB138-22

Original Proposal

IRC: R322.2.2, R322.3.5

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 Residential Code

Revise as follows:

R322.2.2 Enclosed area below required elevation. Enclosed areas, including crawl spaces, that are below the elevation required in Section R322.2.1 shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1:
   2.1. The total net area of nonengineered openings shall be not less than 1 square inch (645 mm^2) for each square foot (0.093 m^2) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the *construction documents* shall include a statement by a registered *design professional* that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.7.2.2 of ASCE 24.

   2.2. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.

   2.3. The presence of louvers, blades, screens and faceplates or other covers and devices shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open area.

Exceptions: The following shall not be required to comply with this section:

1. Elevator shafts.
2. Utility chases that protect utility lines from freezing, provided the utility chases are the minimum size necessary to protect the utility lines and do not provide access for a person to enter the space.

R322.3.5 Walls below required elevation. Walls and partitions are permitted below the elevation required in Section R322.3.2, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design, the *construction documents* shall include documentation prepared and sealed by a registered*design professional* that:
   4.1. The walls and partitions below the required elevation have been designed to collapse from a water load less than that which would occur during the base flood.

   4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.

5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

Exceptions: The following shall not be required to comply with this section:

1. Elevator shafts.
2. Utility chases that protect utility lines from freezing, provided the utility chases are the minimum size necessary to protect the utility lines and do not provide access for a person to enter the space.

Reason: FEMA regularly responds to questions about whether utility chases and elevator shafts that extend below elevated buildings are enclosures. Strictly read, Sections R322.2.2 and R322.3.5 apply to elevator shafts and utility chases that extend below elevated buildings, which means the walls must have flood openings and breakaways wall (Zone V and Coastal A Zones). This code change relaxes those requirements, with some limits, in line with IRC Commentary, ASCE 24, and published FEMA guidance. Those sources explain that elevator shafts do not require openings and breakaway walls, but the shafts must meet other requirements (materials, resistance to flood loads). Those sources also explain that utility chases do not require openings and breakaway walls as long as the chases are the minimize size necessary and are not sized or constructed to allow a person to enter the space. If chases allow entry by a person, they must fully comply with the requirements for enclosures, including the use limitations. Chases must meet other requirements (materials, resistance to flood loads).

Bibliography: NFIP Technical Bulletin 9, Design and Construction Guidance for Breakaway Walls (2021), https://www.fema.gov/emergency-managers/risk-management/building-science/national-flood-insurance-technical-bulletins

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal explicitly allows elevator shafts and utility chases to be conventionally built without the installation of flood openings or use of breakaway walls which are required for enclosures below elevated buildings in flood hazard areas. The code change proposal will decrease the cost of construction by avoiding the installation of at two flood openings in each chase and shaft. 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. NFIP Technical Bulletin 9 contains prescriptive solutions for breakaway walls that do not require certification of design. A typical utility chase is on the order of two to three feet square, thus cost savings are attributable to not having to fabricate approximately eight to twelve feet of breakaway wall.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal provides additional clarity and design options for utility chases and elevator shafts. (Vote: 10-0)

Final Hearing Results

RB138-22 AS

RB139-22

Original Proposal

IRC: R322.3.2

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 Residential Code

Revise as follows:

R322.3.2 Elevation requirements.

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher. <u>Where stem wall foundations are permitted in Coastal A Zones in accordance with Section R322.3.3, the bottom of the lowest horizontal structural member supporting the lowest floor is the top of the foundation wall, or top of the portion of the foundation wall, supporting the slab.</u>
2. *Basement* floors that are below*grade* on all sides are prohibited.
3. Garages used solely for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above*grade* on not less than one side and, if enclosed with walls, such walls shall comply with Item 6.
4. The use of fill for structural support is prohibited.
5. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.
6. Walls and partitions enclosing areas below the elevation required in this section shall meet the requirements of Sections R322.3.5 and R322.3.6.

Reason: Section R322.3.3 Foundations, by exception, allows backfilled stem wall foundations in flood hazard areas designated as Coastal A Zones. Coastal A Zones are areas subject to waves that are between 3 feet and 1.5 feet high. Section R322.3.2 specifies elevation of the "bottom of the lowest horizontal structural members supporting the lowest floor." This proposal does not change the requirement. It clarifies where the "bottom of the lowest horizontal structural member" is located when applicants elect to use backfilled stem wall foundations so that designers, builders, and building officials can readily determine compliance. Relating the required elevation to the wall also removes any confusion should a slab have varying thicknesses at points interior to the perimeter walls. There are different ways to configure the foundation wall and slab connection. Three common options are shown in the figures, with arrows pointing to the top of the foundation wall, or top of the portion of the wall, supporting the slab.

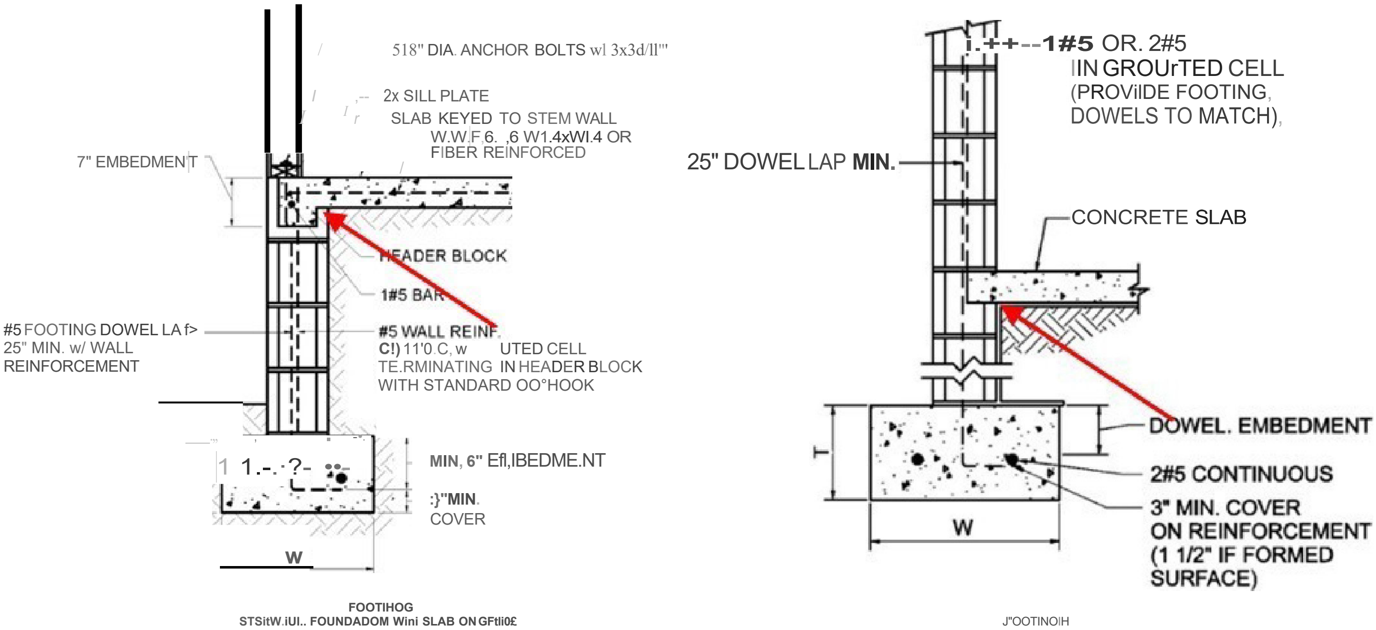
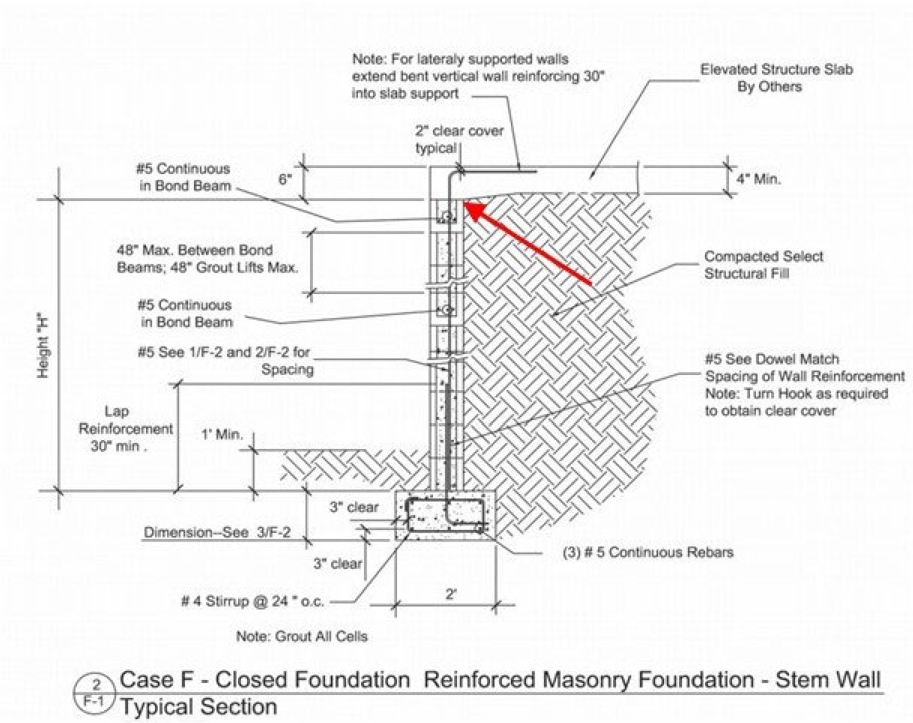


Figure 403.1(1) Concrete and Masonry Foundation Details
(2020 Florida Residential Code)



FEMA P-550 Recommended Residential Construction for Coastal Areas

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal clarifies where the “bottom of the lowest horizontal structural member” is when backfilled stem wall foundations are used in Coastal A Zones. There is no change to the actual requirements for elevation of the bottom of the lowest horizontal structural member. By clarifying existing requirements, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that this proposal clarifies how the elevation is determined for slab on a backfilled stem wall. The committee recommended that the figures provided in the reason be included in the commentary. (Vote: 10-0)

Final Hearing Results

RB139-22 AS

RB140-22

Original Proposal

IRC: R322.3.3

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 Residential Code

Revise as follows:

R322.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas and Coastal A Zones shall be supported on pilings or columns and shall be adequately anchored to such pilings or columns and shall comply with the following:

1. The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of Section R322.3.5.
2. Pilings shall be designed in accordance with ASCE 24 to have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift) and pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling.
3. Columns and their supporting foundations shall be designed in accordance with ASCE 24 to resist combined wave and wind loads, lateral and uplift, and shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the columns. Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24.
4. Flood and wave loads shall be determined in accordance with ASCE 7 and shall include loads ~~those~~ associated with the design flood. Wind loads shall be those required by this code.
5. Foundation designs and *construction documents* shall be prepared and sealed in accordance with Section R322.3.9.

Exception: In Coastal A Zones, stem wall foundations supporting a floor system above and backfilled with soil or gravel to the underside of the floor system shall be permitted provided that the foundations are designed to account for wave action, debris impact, erosion and local scour. Where soils are susceptible to erosion and local scour, stem wall foundations shall have deep footings to account for the loss of soil.

Reason: Section R322.3.3 applies to buildings in coastal high hazard areas and Coastal A Zones. Those are flood zones with wave action. In coastal high hazard areas, also called V Zones, waves are 3 feet and higher during base flood conditions. Wave heights in Coastal A Zones range from 3 ft to 1.5 feet. FEMA has delineated the inland extent of 1.5 foot waves on many Flood Insurance Rate Maps for coastal communities, labeling the line as the Limit of Moderate Wave Action. Section R322.3.9 requires construction documents to be prepared and sealed by registered design professionals. Section R322.3.3 describes the performance expectations for pilings and columns. This proposal requires pilings and columns to be designed in accordance ASCE 24 Flood Resistant Design and Construction, which is the standard of practice for design and construction in flood hazard areas. Relying on the recognized standard of practice facilitates the design professional's task to satisfy the performance expectations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to the technical content of the section. The code already requires foundations in coastal high hazard areas and Coastal A Zones to be designed by registered design professionals to satisfy the performance expectations of Sec. R322.3.3. The change requires designs in accordance with the recognized standard of practice, which facilitates the design professional's task. There will be no cost impact when this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal for indicating that ASCE 24 and ASCE 7 are the proper sources for the design of piles and columns for combined wave and wind loads in coastal hazard areas. (Vote: 10-0)

Final Hearing Results

RB140-22	AS

RB142-22

Original Proposal

IRC: R322.3.5

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 Residential Code

Revise as follows:

R322.3.5 Walls below required elevation. Walls and partitions are permitted below the elevation required in Section R322.3.2, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design, or a resistance to an ultimate load of not less than 17 (814 Pa) and not more than 33 pounds per square foot (1580 Pa); or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress designor an ultimate load of 33 pounds per square foot (1580 Pa), the *construction documents* shall include documentation prepared and sealed by a registered *design professional* that:
   4.1. The walls and partitions below the required elevation have been designed to collapse from a water load less than that which would occur during the base flood.
   4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.
5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2.

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: The committee approved this proposal for providing ultimate loads for the design of breakaway walls as well as the current allowable stress loads. (Vote: 10-0)

Final Hearing Results

RB142-22	AS

RB143-22

Original Proposal

IRC: SECTION 202, R323.1, R323.2 (New), R323.1.1

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Marc Levitan, ICC 500 Storm Shelter Standard Development Committee (icc500@iccsafe.org)

2021 International Residential Code

Revise as follows:

[RB] IMPACT PROTECTIVE SYSTEM. Impact protective systems are defined as follows:

1. Construction that has been shown by testing to withstand the impact of test missiles and that is applied, attached, or locked over exterior glazing.

2. For storm shelters, an assembly or device, subject to static or cyclic pressure and impact testing as detailed in ICC 500, installed to protect an opening in the storm shelter envelope.

R323.1 General. This section applies to the design, construction and installation of *storm shelters* where constructed as either separate detached buildings or ~~where constructed as safe~~ rooms or spaces within buildings for the purpose of providing ~~refuge~~ protection from ~~storms that produce high winds, such as~~ tornados, ~~and~~ hurricanes and other severe windstorms. ~~In addition to other applicable requirements in this code, storm shelters shall be constructed in accordance with ICC 500.~~

Add new text as follows:

R323.2 Construction. Storm shelters shall be constructed in accordance with this code and ICC 500.

Revise as follows:

~~R323.1.1~~ R323.2.1 Sealed documentation. The *construction documents* for all structural components and *impact protective systems* ~~of the~~ installed in *storm* ~~*shelter*~~ *shelters* shall be prepared and sealed by a *registered design professional* indicating ~~that the design meets the criteria of~~ compliance with ICC 500.

Exception: *Storm shelters*, structural components and impact-protective systems that are *listed* and *labeled* to indicate compliance with ICC 500.

Reason: The purpose of this proposal is to correlate IRC Section 323 with the 2020 edition of ICC 500 and with the corresponding IBC Section 423. The changes are editorial and match editorial revisions to the scope of ICC 500, including recognizing extratropical storms are known as hurricanes, typhoons or cyclones depending on the region of the world where they occur.

To match changes made to IBC Section 423 as modified for the 2024 IBC by approved proposal G94-19, and to reflect the division between scoping requirements and construction requirements in ICC 500, a new Section R323.2 is created to hold the basic requirement to construct storm shelters per ICC 500 and the requirement for signed and sealed storm shelter construction documents added to the 2021 IRC.

The current IRC definition of Impact Protective Systems differs from ICC 500 as the IRC definition only applies to protection of exterior glazing from the typical wind-borne debris associated with design-level hurricane events in the IRC and IBC. ICC 500 requires the entire storm shelter envelope – including solid doors, louvers, and other openings – resist debris impacts associated with severe tornadoes and hurricanes exceeding code-level design wind speeds. Since this difference could be misleading for someone unfamiliar with ICC 500, it is suggested to modify the IRC definition. The format matches other definitions such as Wind-Borne Debris Regions, Story Above Grade Plane and Mechanical Joint.

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 changes are editorial and correlate with the current edition of ICC 500. The changes do not impact how a storm shelter is designed, constructed, or installed and thus do not affect the cost of providing a storm shelter.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal is helpful for clarification and correlates to the latest addition is the ICC 500 standard for storm shelters. (Vote:10-0)

Final Hearing Results

RB143-22	AS

RB145-22

Original Proposal

IRC: R324.3.1

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 Residential Code

Revise as follows:

R324.3.1 Equipment listings. *Photovoltaic panels* and modules shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction. Mounting systems *listed* and *labeled* in accordance with UL 2703 shall be installed in accordance with the manufacturer's installation instructions and their listings. BIPV roof coverings and BIPV roof assemblies shall be listed and labeled in accordance with UL 7103.

Reason: This aligns with the 2021 IRC, where UL 7103 replaced UL 1703 as the standard for listing BIPV roofing in Chapter 9.
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 aligns with requirements covered in Chapter 9 of the IRC, and provides clarity as to the applicable standard to be used.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal as it aligns the IRC with UL 7103 which replaced UL 1703 as the standard for listing BIPV roofing. (Vote: 10-0)

Final Hearing Results

RB145-22	AS

RB146-22

Original Proposal

IRC: R324.5, R324.5.1, R324.5.2, R324.5.3, R324.5.2 (New)

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 Residential Code

Revise as follows:

R324.5 Building-integrated photovoltaic systems. Building-integrated photovoltaic (BIPV) systems ~~that serve as roof coverings~~ shall be designed and installed in accordance with Section ~~R905~~ Sections R324.5.1 through R324.5.2.

R324.5.1 ~~Photovoltaic shingles~~ BIPVroofing systems. ~~Photovoltaic shingles~~ BIPV roofing systems shall comply with Section R905.16. BIPV roof panels shall comply with Section R905.17.

~~R324.5.2~~R324.5.1.1 Fire classification. *Building-integrated photovoltaic systems* shall have a fire classification in accordance with Section R902.3.

~~**R324.5.3 BIPV roof panels.** BIPV roof panels shall comply with Section R905.17~~.

Add new text as follows:

R324.5.2 BIPV Exterior wall coverings and fenestration. BIPV exterior wall coverings and fenestration shall comply with Section R705.

Reason: This proposal recognizes that BIPV systems can be in the form of roofing, exterior wall coverings, or fenestration.
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 recognizes other types of BIPV systems that are available for installation, and does not limit to just roofing applications.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal recognizes that BIPV may be more than just roof systems and makes the required adjustments to the IRC. This is a correlation with RB240-22. (Vote 10-0)

Final Hearing Results

RB146-22	AS

RB147-22

Original Proposal

IRC: R324.6, R324.6.3, UL Chapter 44 (New)

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 Residential Code

Revise as follows:

R324.6 Roof access and pathways. Roof access, pathways and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

Exceptions:

1. Detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, carports, solar trellises and similar structures, shall not be required to provide roof access.
2. Roof access, pathways and setbacks need not be provided where the code official has determined that rooftop operations will not be employed.
3. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (17-percent slope) or less.
4. BIPV systems *listed* in accordance with ~~Section 690.12(B)(2) of NFPA 70~~ UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

R324.6.3 Emergency escape and rescue openings. Panels and modules installed on dwellings shall not be placed on the portion of a roof that is below an *emergency escape and rescue opening*. A pathway not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

Exception: BIPV systems *listed* in accordance with ~~Section 690.12(B)(2) of NFPA 70~~ UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

3741-2020	Photovoltaic Hazard Control

Reason: This aligns with the revisions made in F129-21 in the Group A cycle to the IFC.UL 3741 is the national test standard developed to address Section 690.12(B)(2) of NFPA 70. It is a consensus standard developed specifically for the evaluation and testing of rapid shutdown systems and equipment. This proposal will provide clarity on the specific requirements to be used for listing these systems and equipment, and provide the performance anticipated by rapid shutdown operations.
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: F129-21
IFC: 1205.2.3, UL Chapter 80

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is identifying the standard already referred to indirectly within the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee supported adding in the new standard UL 3741. This standard is coordinated with IFC Section 690. The PV materials will also be meeting standards for protection of fire fire suppression personnel. (Vote: 10-0)

Final Hearing Results

RB147-22	AS

RB149-22

Original Proposal

IRC: R324.6.4 (New), UL Chapter 44 (New)

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 Residential Code

Add new text as follows:

R324.6.4 Building-integrated photovoltaic (BIPV) systems. Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location *approved* by the fire code official.

> **Exception:** BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

3741-2020	Photovoltaic Hazard Control

Reason:
This aligns with IFC Section 1205.2.3 and F129-21 from the Group A cycle.

This provides fire fighters with means to determine where the BIPV is on the roof, and aligns with the requirements in the 2021 IFC Section 1205.2.3. The original intent is for reflective marking that could be under an eave and visible from grade, or could be in some other location visible from grade, such that the reflective marking identifies locations where a ladder should not be placed. The BIPV roof covering products themselves do not all need to be reflectorized.

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: F129-21
IFC: 1205.2.3, UL Chapter 80 (New)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal aligns with the fire code requirements.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee disapproved this proposals because few manufacturers are using this detail now. The exception should be the rule or the charging statement. What are the roof access and pathway requirements? The phrase "under the eaves" is confusing for enforcement. The hazard exists on the roof, not under the eaves where this proposal requires markings are indicated - the markings should be on the roof. Most municipalities are also taking care of this locally; they should be able to continue to take care of it locally. The language needs to be reworked on the marking details for appropriate visibility. This should not be required for all systems. The new standard was approved in RB147-22. (Vote: 8-2)

Public Comments

Public Comment 2

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Solar 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); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, National Association of State Fire Marshals (admin@firemarshals.org) requests As Submitted

Commenter's Reason: This proposed requirement already exists in the ICC codes (IFC Section 1205.2.3). That section was further refined by Proposal F129-21 that was approved by the membership in the Group A cycle. Consistency in code requirements in the family of ICC codes is important in order to have consistency in interpretation and enforcement. Roof access and pathway requirements are already covered in Section R324.6. The reason for the required markings to be located under the eaves is to enable the firefighters to properly locate their ladders as well as identify where the hazards may be in the event of a fire.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal aligns with the fire code requirements.

Final Hearing Results

RB149-22	AS

RB150-22

Original Proposal

IRC: SECTION 202 (New), R324.7 (New), R324.7.1 (New), 324.7.2 (New)

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

Add new definition as follows:

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:

R324.7 Elevated photovoltaic (PV) support structures. Elevated PV support structures used as an accessory structure shall comply with either Section R324.7.1 or R324.7.2.

R324.7.1 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.

324.7.2 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 R902.4.

Reason:
This is in alignment with G193-21 for the IBC in the Group A cycle.

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, but could be built in a variety of locations with or without cars parked beneath.

This addresses structures with open grid framing and without a roof deck or sheathing, which supports the photovoltaic panel systems.

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.

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

The code change proposal will not increase or decrease the cost of construction. This proposal provides more options in construction with clear requirements for another type of photovoltaic installation (i.e. an alternative to rooftop mounted PV or building-integrated PV).

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal gives clarity for the type of photovoltaic support structures that's not currently addressed in the code. This gives the code user guidance and standards to comply with. It provides options that weren't there before. There were concerns raised about the definition and if this structure could be constructed over a roof. (Vote: 6-5)

Public Comments

Public Comment 1

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); C Ray Allshouse, City of Shoreline, Washington Association of Building Officials Technical Code Development Committee (rallshouse@shorelinewa.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R324.7 Elevated photovoltaic (PV) support structures. Elevated PV support structures used as an accessory structure shall comply with either Section R324.7.1 or R324.7.2. <u>Elevated PV support structures shall be considered a roof for the purposes of establishing the number of stories and fire separation distances.</u>

Commenter's Reason: This public comment is intended to address two issues: elevated PV structure on top of a building creates another story, and it creates a condition akin to having roof eaves extend close to the property line. It is intended to address the comment made by the Committee, as published in the 2022 Report of the Committee Action Hearings regarding the number of stories.
WABO TCD raised this issue at the 2021 Group A Public Comment Hearings, on a proposal that is closely related to RB150-22 (G193-21). We submitted a public comment to disapprove G193 because the definition implies the space below the elevated PV can be used for any occupancy, which could create confusion regarding story count and fire separation distances. However, under heavy pressure from several proponents of G193 (some of whom recognized the issues we were raising), we ultimately we agreed to provisionally support the proposal as submitted in order not to torpedo the whole proposal because it dealt with some other important fire safety issues. Story count and fire separation distance are still issues that will need to be addressed in the IBC, but unfortunately, the same issues are being propagated into the IRC via the identical definition.

As pointed out in our objections to G193 in Group A, this is not a theoretical issue. Since an accessory structure isn't necessarily detached from a building, Section R324.7.2 can be read to allow elevated PV to be mounted on the roof of a building. Once it is there, does it or does it not create a story? Our members have had to deal with projects submitted for permit with large elevated PV systems "shading" occupied roofs on mid-rise residential buildings, where the designers contended that they weren't a roof, and therefore, didn't create an additional story or create fire separation distance issues. For IRC structures, the issue is the same--would adding elevated PV above a roof deck (occupiable roof) on top of a 3-story house create a fourth story, thereby creating a non-conformity with the IRC? We contend the answer is "yes." We would also like to point out that no technical justification has been presented to demonstrate these should be treated differently, from a fire spread standpoint.

Instead of modifying the definition for elevated PV structures or arguing for disapproval, this public comment more directly addresses the issues we've raised by requiring the elevated PV to comply with story count and fire separation distances:

- We contend that an elevated PV structure, with a<u>minimum</u> of 7' clearance below creates a roof-like structure, as far as fire is concerned--it will contain heat and smoke just as much as a roof eave or a roof providing shade over an occupied roof. This is especially true given there are no requirements or criteria for openness of an elevated PV structure.
- The proposed definition clearly intends the space below to be usable, else there would be no reason for including "providing shade" in the definition. Once you have a usable space with a roof-like structure overhead, you clearly have created a story. If this does not create a story, then why would any other roof structure such as a 500 square foot hard roof over an occupiable roof create a story?
- Where there is occupiable space below the elevated PV, and where the PV extends close to the property line, you should be considering spread of fire to and from the adjacent property, which is the purpose of establishing fire separation distances.

In discussions with one of the organizers of the effort to introduce the code change, it was suggested that instead of language that would prohibit placing elevated PV on a roof where it would create an over-story condition, that we propose language instead that describes where it would be allowed. Because of the difficulty in trying to address all the variables of where this would be allowed, this public comment takes the approach of saying if you put elevated PV on a roof, treat it like another roof, just as you would any other roof structure.

We want to emphasize that this public comment states the elevated PV gets**treated as** a roof for story count and fire separation distance purposes. It does <u>**not**</u> say the PV <u>**is**</u> a roof--it's just treated as such for those two issues, and those two issues only. Effectively, elevated PV can't be put on top of a 3-story IRC building, because that would create a 4th story, which is not in the scope of the IRC. The building official can then apply their normal policies regarding roofs near the property line, for fire separation/adjacent property protection purposes.

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 the original proposal states the proposal will not increase or decrease the cost of construction, as it is just adding options. This public comment does not change the fact that these are options, so it will have no effect on the original cost impact statement.

Final Hearing Results

RB150-22	AMPC1

RB152-22

Original Proposal

IRC: R325.3, R325.5
Proponents: Gary Ehrlich, NAHB, NAHB (gehrlich@nahb.org)

2021 International Residential Code

SECTION R325
MEZZANINES

R325.1 General. *Mezzanines* shall comply with Sections R325 through R325.5.

R325.2 Mezzanines. The clear height above and below *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

Revise as follows:

R325.3 Area limitation. The aggregate area of a *mezzanine* or *mezzanines* shall be not greater than one-third of the floor area of the room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the *mezzanine* is located.

Exception: The aggregate area of a *mezzanine* located within a *dwelling unit* equipped with an automatic sprinkler system in accordance with Section P2904 shall not be greater than one-half of the floor area of the room, provided that the *mezzanine* meets all of the following requirements:

1. Except for enclosed closets and bathrooms, the *mezzanine* is open to the room in which such *mezzanine* is located.
2. The opening to the room is unobstructed except for walls not more than 36 ~~42~~ inches (914 ~~1067~~ mm) in height, columns and posts.
3. The exceptions to Section R325.5 are not applied.

R325.4 Means of egress. The means of egress for *mezzanines* shall comply with the applicable provisions of Section R311.

Revise as follows:

R325.5 Openness. *Mezzanines* shall be open and unobstructed to the room in which they are located except for walls not more than 36 inches (914 mm) in height, columns and posts.

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

~~1.~~ *Mezzanines* or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.

~~2. In buildings that are not more than two stories above *grade plane* and equipped throughout with an automatic sprinkler system in accordance with Section R313, a *mezzanine* shall not be required to be open to the room in which the *mezzanine* is located.~~

Reason:
This amendment reduces the allowable height of a wall enclosing a mezzanine that is greater than one-third of the room below but less than one-half of the room below to 36" to match the standard guard height required in the IBC as well as matching the allowable wall height in section R325.5 and adds beams to exception #2 and section R325.5 as part of the list of structural components.

This change also deletes exception #2 to the openness requirements of the mezzanine. This exception was extracted directly from the IBC and addresses mezzanines in office buildings, supermarkets, industrial facilities, and other types of buildings where it may be desirable to fully enclose a mezzanine to provide office space, employee breakrooms, storage rooms, or similar uses. In a typical one- and two-family dwelling or a townhouse, mezzanines are generally open to the floor below except for the guard required by code or any closets or bathrooms. If a homeowner or builder desires an enclosed mezzanine, they could apply IBC Section 505 to the construction of the mezzanine.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposed change should provide some reduction in cost by allowing a 36" wall in lieu of the current requirement of 42".

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R325.3 Area limitation. The aggregate area of a *mezzanine* or *mezzanines* shall be not greater than one-third of the floor area of the room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the *mezzanine* is located.

Exception: The aggregate area of a *mezzanine* located within a *dwelling unit* equipped with an automatic sprinkler system in accordance with Section P2904 shall not be greater than one-half of the floor area of the room, provided that the *mezzanine* meets all of the following requirements:

1. Except for enclosed closets and bathrooms, the *mezzanine* is open to the room in which such *mezzanine* is located.
2. The opening to the room is unobstructed except for walls not more than 42 ~~36~~ inches (1067~~914~~ mm) in height, columns, beams and posts.
3. The exceptions to Section R325.5 are not applied.

R325.5 Openness. *Mezzanines* shall be open and unobstructed to the room in which they are located except for walls not more than 42 ~~36~~ inches (1067~~914~~ mm) in height, columns, beams and posts.

Exception:

Mezzanines or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.

Committee Reason: The modification in Sections R325.3 Exception 2 and R325.5 changed the 36 inches to 42 inches for an additional level of safety and/or some tolerance in the guard height. This also allows for a lowered beam at this same location. The committee supported this proposal as modified because this removes an exception for the enclosed mezzanine that is more typical of commercial buildings rather than residential buildings. (Vote: 9-0)

Final Hearing Results

RB152-22	AM

RB153-22

Original Proposal

IRC: SECTION 202 (New), SECTION R314.3, SECTION R325.1, SECTION R326 (New), R326.1 (New), R326.2 (New), R326.3 (New), R326.4 (New), R326.5 (New), R326.5.1 (New), R326.5.2 (New), R326.5.2.1 (New), R326.5.2.2 (New), R326.5.2.3 (New), R326.5.3 (New), R326.5.3.1 (New), R326.5.3.2 (New)

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, 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 Residential Code

Add new definition as follows:

SLEEPING LOFT. A space on an intermediate level or levels between the floor and ceiling of a story, open on one or more sides to the room in which the space is located, and in accordance with Section R326.

Add new text as follows:

SECTION R326
SLEEPING LOFTS

R326.1 Sleeping lofts. Where provided in dwelling units or sleeping units, sleeping lofts shall comply with this code as modified by Sections R326.2 through R326.5. Sleeping lofts constructed in compliance with this section shall be considered a portion of the story below. Such sleeping lofts shall not contribute to the number of stories as regulated by this code.

Exception: Sleeping lofts need not comply with Section R326 where they meet any of the following conditions:

1. The sleeping loft has a maximum depth of less than 3 feet (914 mm).
2. The sleeping loft has a floor area of less than 35 square feet (3.3 m).
3. The sleeping loft is not provided with a permanent means of egress.

R326.2 Sleeping loft limitations. Sleeping lofts shall comply with the following conditions:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m).
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 Sections R326.3 through R326.5 shall not apply to sleeping lofts that do not comply with Items 1 and 2.

R326.3 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). Spaces adjacent to 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.

R326.4 Sleeping loft area. The aggregate area of all sleeping lofts and mezzanines within a room shall comply with Section R325.3.

Exception: The area of a single sleeping loft located within a dwelling unit or sleeping unit equipped with an automatic sprinkler system in accordance with Section P2094 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.

R326.5 Permanent egress for sleeping lofts. A permanent means of egress shall be provided for sleeping lofts. The means of egress shall comply with Section 311 as modified by Sections R326.5.1 through R326.5.3.

R326.5.1 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.

R326.5.2 Stairways. Stairways providing egress from sleeping lofts shall be permitted to comply with Sections R326.5.2.1 through R326.5.2.3.

R326.5.2.1 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).

R326.5.2.2 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.

R326.5.2.3 Landings. Landings at stairways providing egress from sleeping lofts shall comply with Section R311.7.6, except that the depth of landings in the direction of travel shall be not less than 24 inches (508 mm).

R326.5.3 Ladders. Ladders complying with Sections R326.5.3.1 and R326.5.3.2 shall be permitted as a means of egress from sleeping lofts.

R326.5.3.1 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).

R326.5.3.2 Incline. Ladders shall be inclined at 70 to 80 degrees from horizontal.

SECTION R314
SMOKE ALARMS

Revise as follows:

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of~~the~~ bedrooms and sleeping lofts.
3. On each additional story of the *dwelling*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.

5. In the hallway and in the room open to the hallway in *dwelling units* where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.

SECTION R325
MEZZANINES

Revise as follows:

R325.1 General. *Mezzanines* shall comply with Sections R325 through R325.5.

<u>**Exception:** Sleeping lofts in dwelling units and sleeping units shall be permitted to comply with Section R326, subject to the limitations in Section R326.2.</u>

Reason: Lofts in dwelling units and sleeping units are being designed and built around the country, but there is nothing in the codes to give designers or code officials guidance as to what's acceptable. This proposal places provisions into the body of the code that balance flexibility of design with maintaining a reasonable minimum standard of safety for these spaces.
A similar proposal placing this option into the appendix of the IBC was approved in Group A (G112-21, AMPC 2). Because we believe the issue of how to reasonably regulate sleeping lofts is prevalent and important enough to warrant placement in the body of the code, and because there was substantial support from a range of stakeholders at the Group A Public Comment Hearings (61% of the voters at the PCH supported the public comment that would have placed this in the body of the code), we are placing these provisions into the main body of the IRC, not in an appendix.

Figure 1 below shows a very recent example of an as-built (but not as-approved) sleeping loft constructed as part of a larger bedroom in a one-family dwelling in eastern Washington State. Figure 2 shows the same photo with an approximation of an IRC-compliant guard added.

Technical features of this proposal:

- We've inserted the sleeping loft provisions into a new Section R326, between mezzanines and habitable attics. We think sleeping lofts are more closely related to mezzanines (R325) than they are to habitable attics (current R326). (Note: This does not replace the existing Section R326. We expect ICC Staff will renumber the remaining sections in the chapter.)
- Sleeping lofts are an <u>option</u> (R326.1, "Where provided…..") It will be up to the designer to decide whether or not to designate these areas as sleeping lofts.
- Sleeping lofts are required to comply with the base code, except where the provisions of this new section modify them (R326.1).
- 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 this section (R326.1, Exception).
- Similar to mezzanines, sleeping lofts are considered a portion of the story to which they open, and do not add to the number of stories of the building (R326.1).
- Sleeping lofts must be smaller than 70 square feet, and any ceiling height above the sleeping loft cannot exceed 7 feet for more than half of its area. The intent is to keep sleeping lofts as small spaces. Once the space is provided with dimensions that are equivalent to habitable residential living spaces, the breaks for height, ceiling height, area, and means of egress in this section no longer apply, and the space must meet the full requirements of the code (R326.2)
- The requirement for 7 feet below the sleeping loft (R326.3) is drawn from Section R325.2 regarding clear height below mezzanines. This was added in our Group A proposal last year in response to comments we received from a General Committee member. We actually don't see an issue with having shorter, usable spaces below sleeping lofts, but the 7-foot dimension is consistent with the required height of spaces below mezzanines, and also reflects what we have seen in real-world project proposals (see Figure 1 below). Ceiling heights in sleeping lofts can be as little as 3 feet.
- One or more sleeping lofts and mezzanines are allowed, but only if the cumulative area complies with the Section R325.3 area limitations for mezzanines (R326.4). The exception allows a single sleeping loft in a smaller room in a sprinklered dwelling unit up to 69.9 square feet (R326.2), as long as the sleeping loft area does not exceed two-thirds of the area of the main room. The two-thirds figure is based on IBC allowances for mezzanines and equipment platforms (see IBC 505.2.1.1).

- A permanent means of egress is required for sleeping lofts complying with this new section (R326.5). (The exception to R326.1 kicks you out of this section if you don't have a permanent means of egress.) Although for the most part, the means of egress is required to comply with Section R311, this section allows some modifications:
  - Steeper and narrower stairs (R236.5.2) are allowed, based on the stair requirements in IRC Appendix Q for lofts in tiny houses.
  - Permanently installed ladders are permitted as the means of egress (R326.5.3), again using the tiny house parameters from IRC Appendix Q.
  - Note: Sections R311.7.11 and R311.7.12 already allow the use of alternating tread devices or ship's ladders "to be used as an element of the means of egress for **lofts** [emphasis added] … of 200 gross square feet or less …," and therefore do not need to be mentioned in this section.
- Smoke alarms are required to be installed in the "immediate vicinity" of sleeping lofts (revised R314.3, Item 2). At the Group A PCH last year, we received feedback from two former fire officials that smoke alarms shouldn't be required in the sleeping loft itself, but because there are cases where a smoke alarm may not be nearby, we believe one should be located in the vicinity of the loft to provide early warning. Looking at Figure 1 below, because this is a bedroom, a smoke alarm is required to be located in the vaulted area per the smoke alarm listing, not in the hallway as constructed. However, if instead this sleeping loft opened to a living room, the current Section R314.3 would not require a smoke alarm in the vaulted ceiling area.
- Sleeping lofts may be confused with mezzanines, so the exception to R325.1 points the user from the mezzanine section to the sleeping loft section.

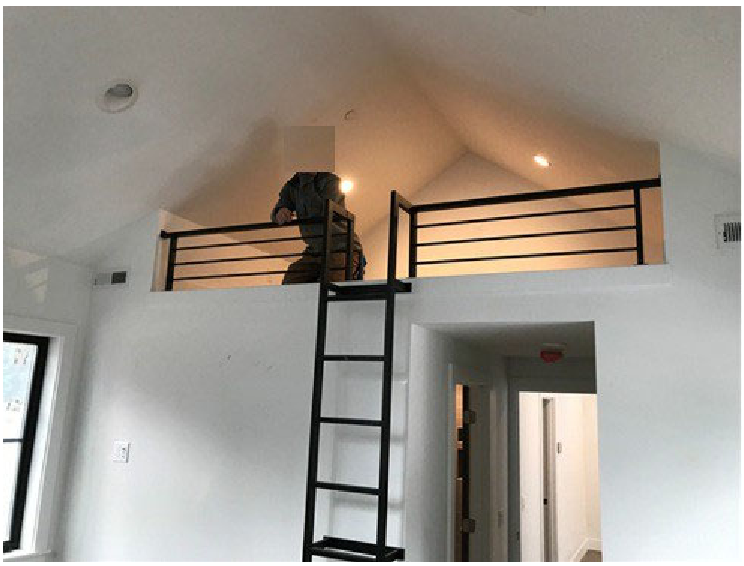


FIGURE 1: Sleeping loft in a bedroom (as built)

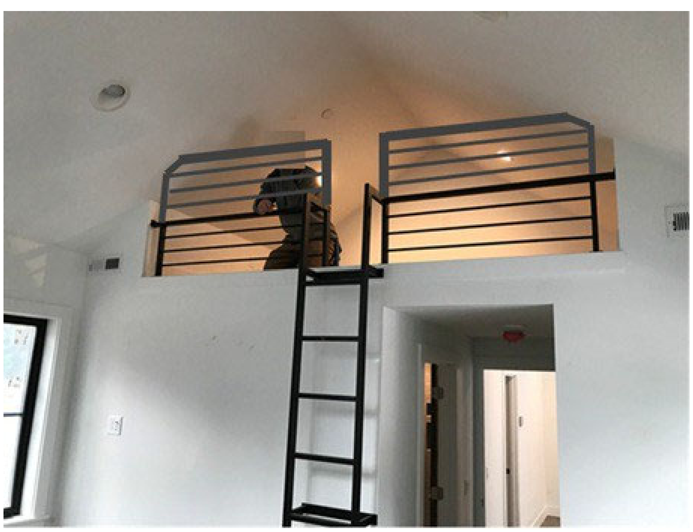


FIGURE 2: Sleeping loft in a bedroom, with code-compliant guard

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R326.2 Sleeping loft limitations. Sleeping lofts shall comply with the following conditions:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m).

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 Sections R326.3 through R326.5 shall not apply to sleeping lofts that do not comply with Items 1 and 2~~.

Committee Reason: The modification removed the confusing sentence at the end of Section R326.2 which is also covered in the definition. The committee decided this proposal as modified provides an option for sleeping lofts that are becoming more popular in the design of homes. Despite expectations of more difficult access, the committee felt use of sleeping lofts will be more by youth that are adept at climbing ladders. Some of the committee was concerned about the safety aspects with the smoke detector in the general vicinity which means it's usually outside in the hallway. Concern was also expressed that the title sleeping lofts implies a sleeping room which then kicks in emergency escape and rescue and habitable space requirements. (Vote: 7-2)

Public Comments

Public Comment 1

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, 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) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

SECTION R314 SMOKE ALARMS

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.

2. Outside each separate sleeping area in the immediate vicinity of<u>the</u> bedrooms~~ and sleeping lofts~~.

3. On each additional story of the *dwelling*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.

5. In the hallway and in the room open to the hallway in *dwelling units* where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.
6. <u>Within the room to which a sleeping loft is open, in the immediate vicinity of the sleeping loft</u>.

Commenter's Reason: This public comment was developed in response to comments received from IRC-B Committee members and others after the Committee Action Hearings. It is intended to clarify that the smoke alarm that is required for sleeping lofts must be located in close proximity to the sleeping loft.
The approved code change proposal required that the smoke alarm be located "in the immediate vicinity" of the sleeping loft. Our intent was that a nearby device would provide early warning of a fire to anyone who was in the sleeping loft, to somewhat compensate for the non-traditional egress and lower ceiling height. The comment we received was that since the requirement appeared in the same item as bedrooms, if the loft was located within a bedroom, the code language could be interpreted to allow the required smoke alarm to be located in the hallway outside of the bedroom. In addition, as we were working on the public comment to clarify our intent, it was noted that if the sleeping loft opened into a very large room, the language should not allow the smoke alarm to be located at the far end of the room.

For this public comment, because we thought it would be clearer to separate the sleeping loft requirement from the current requirement for bedrooms, we are proposing a new Item 6 to deal with sleeping lofts, and have returned the text in Item 2 to the original language in the 2021 IRC. The new Item 6 clarifies:

1. The smoke alarm must be located within the room to which the sleeping loft opens. This should address the concern regarding locating the alarm in the hallway.
2. Within the room, the smoke alarm must be located in close proximity to the sleeping loft ("in the immediate vicinity"). This allows some flexibility in locating the smoke alarm, but should address the concern that it could be located a long distance away if the sleeping loft is open to a very large room.

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 is a clarification of the original proposal, and therefore has no effect on the cost impact statement for the original code change: "Because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements."

Public Comment 2

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, 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) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

SECTION R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics*<u>, the room to which a sleeping loft is open</u>, and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or court having a minimum width of 36 inches (914 mm) that opens to a *public way*.

Exceptions:

1. *Storm shelters* and *basements* used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).

2. Where the *dwelling unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   2.1. One means of egress complying with Section R311 and one*emergency escape and rescue opening*.

   2.2. Two means of egress complying with Section R311.

3. A *yard* shall not be required to open directly into a*public way* where the *yard* opens to an unobstructed path from the*yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).

Commenter's Reason: This public comment is being submitted in response to concerns raised by IRC-B Committee members regarding "safety" during the Committee Action Hearings. In discussions with the members outside of the hearings after the proposal was heard, the specific safety concern appears to boil down to the fact that they felt the code should require an emergency escape and rescue opening (EERO) for occupants of the sleeping loft. In those discussions, we broached the concept being proposed in this public comment, and the members indicated they agreed it would address their concerns.
This public comment adds a requirement that an EERO is required to be provided from the room to which a sleeping loft opens. Whereas IRC Appendix Q for Tiny Homes requires an EERO or similar opening in the roof be provided from a loft, in this proposal, the EERO does not need to be located in the sleeping loft itself, since this would be impractical in many of the dwelling unit configurations that we have seen. Such a requirement would also severely limit designs wanting to incorporate sleeping lofts--the lofts would either have to abut an exterior wall or be located just below a roof. Given there will also be good early warning for sleeping loft occupants (the sleeping loft must be open to the space and have a smoke alarm in close proximity), having an EERO from the space should provide adequate safety.

We also received some comments to the effect that in some building officials' interpretations, opening a sleeping loft to another room makes that other room a sleeping room, and would thus require a EERO. This public comment will not conflict with that interpretation, but makes the requirement clear without codifying that interpretation, since not all building officials agree with it.

In bringing sleeping loft provisions into the appendix of the 2024 IBC during the 2021 Group A cycle (G112-21), we received conflicting comments from different members of the fire service on whether the EERO should be required. Ultimately, the appendix was approved without the EERO, but if this public comment is approved, our intent would be to align the IBC with the IRC in the next cycle.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
While this public comment could increase the cost of construction for sleeping lofts as compared to the original proposal, as stated for the original proposal, "because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements."

Public Comment 3

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self (jonsiuconsulting@gmail.com); Micah Chappell, Seattle Department of Construction and Inspections, Self (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

SLEEPING LOFT. A space <u>designated for sleeping</u> on an intermediate level or levels between the floor and ceiling of a story, open on one or more sides to the room in which the space is located, and in accordance with Section R326.

Commenter's Reason: This public comment is being submitted in response to a last-minute observation from one of the supporting speakers at the Committee Action Hearings, that while the original proposal uses the term "sleeping loft" throughout, nowhere in the proposal does it actually say the space is used for sleeping. There was no testimony from the floor or by the committee on this issue, so everyone seems to understand that "sleeping" is part of what makes these "sleeping lofts." However, if others feel this is a hole in the proposal, this public comment adds to the definition, saying the space has to be designated for sleeping in order for it to be a sleeping loft. We anticipate that normally, the space would be designated as a "sleeping loft" on the plans.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The original cost impact statement states that since sleeping lofts are an option, there is no impact to the cost of construction. This public

comment merely clarifies the definition to state the obvious, so there is no effect on the original cost impact statement.

Final Hearing Results

RB153-22	AMPC1,2,3

RB154-22

Original Proposal

IRC: R326.3
Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Residential Code

Revise as follows:

R326.3 Story above grade plane. A habitable attic shall be considered a story above grade plane.

Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

1. The aggregate area of the habitable attic is either of the following:
   1.1. Not greater than one-third of the floor area of the story below.
   1.2. Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904.
2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.
3. The floor of the habitable attic does not extend beyond the exterior walls of the story below.
4. Where a habitable attic is located above a third story, ~~the dwelling unit or townhouse unit shall be equipped with~~a fire sprinkler system in accordance with Section P2904 shall be installed in the habitable attic and the townhouse unit or dwelling unit or units located beneath the habitable attic.

Reason: This revision corrects an oversight in the existing text that could be interpreted to not require sprinklers in both dwelling units beneath a habitable attic if the attic were located above a stacked duplex. This was the intent of the current provision but was not clearly stated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is intended as a clarification of how the existing provisions are to be applied.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R326.3Story above grade plane. A habitable attic shall be considered a story above grade plane.
Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

1. The aggregate area of the habitable attic is either of the following:
   1.1. Not greater than one-third of the floor area of the story below.
   1.2. Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904.

2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.

3. The floor of the habitable attic does not extend beyond the exterior walls of the story below.

4. Where a habitable attic is located above a third story, a fire sprinkler system in accordance with Section P2904 shall be installed in the habitable attic and remaining portion of the townhouse unit or dwelling unit or units located beneath the habitable attic.

Committee Reason: The modification to Section R326.3 clarifies that the habitable attic is part of the unit. The committee felt this proposal as modified provides clarity for where and when the sprinklers are required to be installed. (Vote: 9-0)

Final Hearing Results

RB154-22	AM

RB157-22

Original Proposal

IRC: R328.4
Proponents: Chad Sievers, New York State, Deparment of State (chad.sievers@dos.ny.gov)

2021 International Residential Code

Revise as follows:

R328.4 Locations. *ESS* shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with Section R302.6.
3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^5/_8$-inch (15.9 mm) Type X gypsum wallboard. Openings shall be equipped with solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than 1-3/8 inches (35 mm) thick, or door with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or automatic-closing device. Penetrations through the required gypsum wallboard shall be protected as required by Section R302.11, Item 4.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

Reason: The energy storage system presents a fire hazard to the occupants of the dwelling. The code already requires a fire protective envelope around ESS but the code has left holes in this envelope, including penetrations and the door. To reduce the chance of fire spread and allow its occupants ample amount of time to evacuate the building the envelope must be sealed. This can easily be done by requiring a fire-rated door or equivalent and to seal any penetrations.

Cost Impact: The code change proposal will increase the cost of construction
The additional cost of the door and sealants will increase the cost of a dwelling with an energy storage system but will be a small fraction of the total cost for an ESS installed.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R328.4 Locations. *ESS* shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with Section R302.6.
3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit.

4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^{5}/_{8}$-inch (15.9 mm) Type X gypsum wallboard. Openings into the dwelling shall be equipped with solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than 1-3/8 inches (35 mm) thick, or door with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or automatic-closing device. Penetrations through the required gypsum wallboard into the dwelling shall be protected as required by Section R302.11, Item 4.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

Committee Reason: The modification on Section R328.4 Item 4, by adding "into the dwelling", specified protected openings and penetrations relative to the dwelling and not to the outside. The proposal as modified makes the level of protection similar to garages for doors and penetrations, and having a car and an ESS in the garage should have at least the same level of protection. Concern was shared that these systems are evolving and there's going to be more of them and therefore more instances of failure. (Vote 6-4)

Final Hearing Results

RB157-22	AM

RB158-22

Original Proposal

IRC: R328.1

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:

R328.1 General. *Energy storage systems (ESS)* shall comply with the provisions of this section.

Exceptions:

1. *ESS listed* and *labeled* in accordance with UL 9540 and marked "~~For~~ Suitable for use in residential ~~dwelling units~~ habitable spaces" where installed in accordance with the manufacturer's instructions and NFPA 70.
2. *ESS* less than 1 kWh (3.6 megajoules).

Reason: Intended to clarify what the product marking actually is. To align with the wording that will ultimately be in the standard.
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 aligns with the marking requirements in UL 9540.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee was not comfortable with the language for marking an ESS because the felt the proposed text is ambiguous and misleading when it comes to dwelling units. The testimony was that the testing standard, UL9540, is so high, no technology meets it yet. For ESS's in dwelling units it is important to be sure the standard is done correctly. (Vote 8-2)

Public Comments

Public Comment 1

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Solar 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); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, National Association of State Fire Marshals (admin@firemarshals.org) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

R328.1 General. *Energy storage systems (ESS)* shall comply with the provisions of this section.

Exceptions:

1. *ESS* *listed* and *labeled* for use in habitable spaces in accordance with UL 9540 and~~marked "For use in residential dwelling units"~~ where installed in accordance with the listing, the manufacturer's instructions and NFPA 70.
2. *ESS* less than 1 kWh (3.6 megajoules).

Commenter's Reason: The purpose of this code change proposal is to provide clarity where there is currently confusion regarding product markings.
As background, the text for the product marking that is currently in the code is in the current edition of the product standard UL 9540. This was added in the code by Public Comment 1 to RB154-19. That Public Comment was a consensus of all the ESS stakeholders. As noted in the Reason Statement for that Public Comment, the marking proposed in Section R327.1 was intended to exempt a UL 9540 listed ESS that will not go into thermal runaway or produce flammable gas when subjected to the UL 9540A Cell Level Test (for further detail, please also see the reason statement for Proposal RB157-18).

There is currently a proposal to UL 9540 to change the text of that marking, as well as additional clarifications on the testing required for the ability to apply such marking on an ESS. The reason for the proposed change to UL 9540 is because there has been a lot of confusion in the field regarding the current markings in UL 9540A pertaining to residential systems that may or may not employ battery technologies that meet the cell level performance criteria of UL 9540A, which is that thermal runaway was not able to be initiated and there was no venting of flammable gas. This is a very severe criteria, but if met, it would suggest that the battery energy storage system (BESS) does not present any greater fire hazard then another electrical appliance and can be installed anywhere in a residence including the habitable spaces. As of this date, we are not aware of technologies that can meet these criteria. Further, this marking has created considerable confusion in the market.

The Standards Technical Panel for UL 9540 is working on improving the markings to clarify what ESS products have been tested to appropriate requirements to determine suitability for use in habitable spaces. UL's Collaborative Standards Development System (CSDS) provides online access to review and submit proposals for UL's Standards development process. General access is available for information on STP meetings, submitting proposals, and access to free proposals. **For more information, click here**, or go to www.ul.com/standards.

To address the confusion of the text of the marking currently identified in the IRC, this Public Comment is proposing to identify the intent, which is that this exception applies only where the ESS has been listed and labeled for specific use in habitable spaces, based on specific testing criteria in UL 9540.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The modifications to this section removes confusion created by the specific text of the marking, will retaining the intent and purpose of the exception.

Final Hearing Results

RB158-22	AMPC1

RB161-22

Original Proposal

IRC: R328.8, R328.8.1 (New), FIGURE R328.8.1 (New), R328.8.2 (New), R328.8.3 (New)

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 Residential Code

Revise as follows:

R328.8 Protection from impact. *ESS* installed in a location subject to vehicle damage shall be protected~~by *approved* barriers~~ in accordance with Section R328.8.1 or R328.8.2.

Add new text as follows:

R328.8.1 Garages. Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section R328.8.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure R328.8.1):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches (610 mm) from the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inch (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.

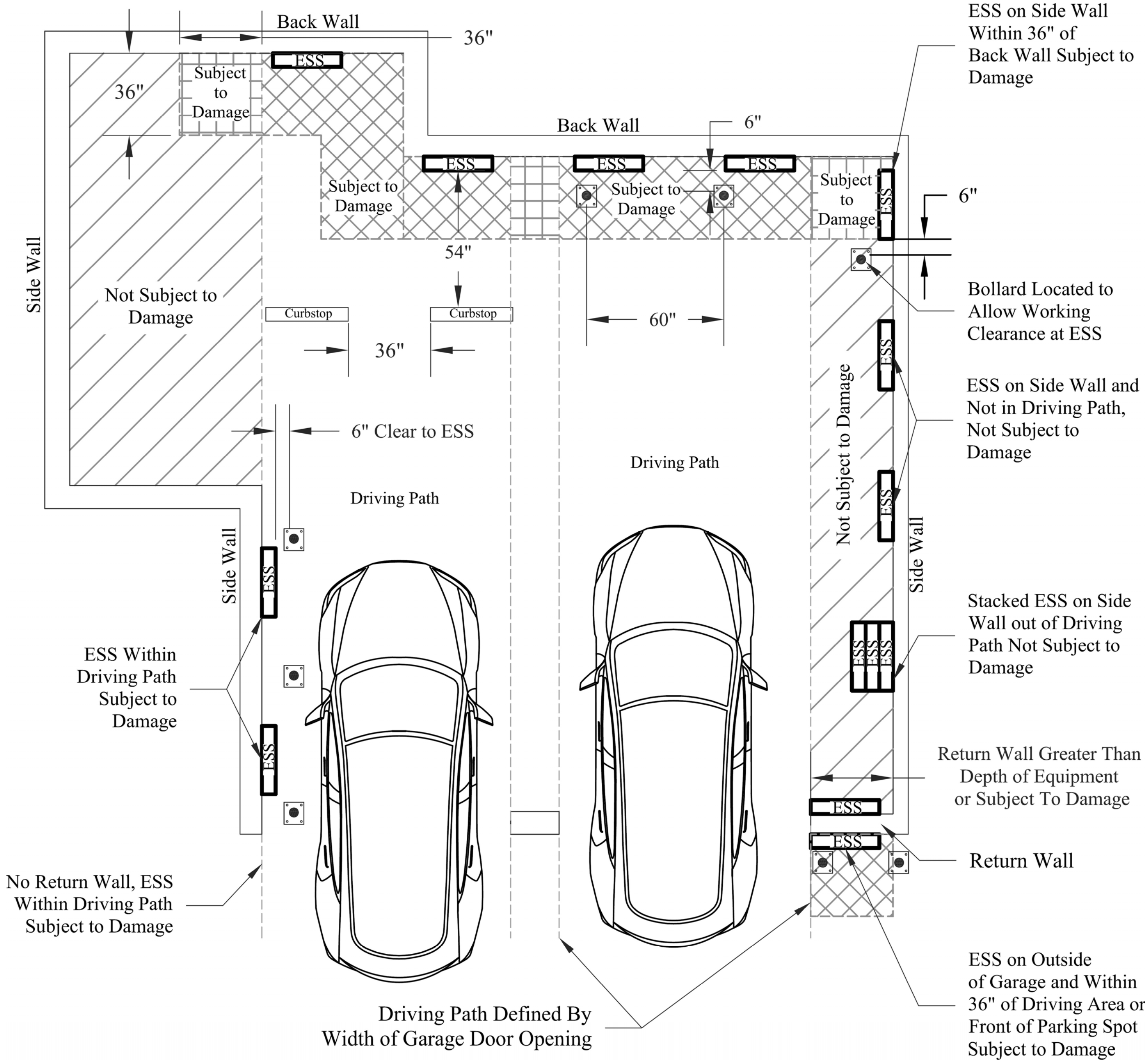


FIGURE R328.8.1 ESS VEHICLE IMPACT PROTECTION

R328.8.2 Other locations subject to vehicle impact. Where an ESS is installed in a location other than as defined in Section R328.8.1, and is subject to vehicle damage, impact protection shall be provided in accordance with Section R328.8.3.

R328.8.3 Impact protection options. ESS protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete, and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.
   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of 4-1/2 inch (114 mm) concrete anchors with 3 inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.
   1.3. Pre-manufactured steel pipe bollards filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ESS.

2. Wheel barriers constructed in accordance with one of the following:
   2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS. Minimum 3– ½ inch (90 mm) diameter concrete anchors with 3 inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be no greater than 36 inches (914 mm).
   2.2. Pre-manufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.

3. *Approved* method designed to resist a 2000 pounds per square foot (8899 Newtons) impact in the direction of travel at 24 inches (608 mm) above grade.

Reason: This proposal aligns with F155-21 in the Group A cycle for the IFC. The intent is to provide clear methods for providing vehicle impact protection.
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.

Technical Justification
An engineering review of the impact protection guidance found across the I-Codes and ASCE 7-16 was completed. Specifically Section 312 of both the prior and existing IFC, Section 4.5.3 of ASCE 7-16, and commentary language and figures associated with Section 304.6 of the IMC.

It is important to recognize that the prescription of the IFC Section 312 for bollards in public driving areas does not lead to a bollard that will resist 12k lbs. as prior editions of the code suggested.. In actual testing ((Harrison (SwRI), Evaluation of collision protection provided by vehicle impact bollards and propane cylinder exchange cabinets 2013)) the static resistance was between 900 lbs. at 36" (2.7k lbs. reaction) and 11k lbs. at 36" (33k lbs. reaction).

ASCE 7-16 specifies vehicle barrier systems must resist 6k lbs. load at between 18" and 27" (9k to 13.5k lbs. reaction.) There are no commonly available retrofittable bollards that can do this in an average residential garage without adding thickness to the concrete.

The IMC commentary figure when back calculated sets a bar of physical resistance which seems more appropriate to this risk and allows for solutions that are more practical to apply. For example, the bollard shown in IMC commentary Figure 304.6(2) will take an impact of about 625 lbs. load applied at 24", resulting in a 1250 lb reaction force at the post to base plate connection. Likely outcomes based on this force include:

No damage at 0.5 mph impact from an average passenger car.

Bollard would deflect permanently a few inches at a 2 mph collision speed

Anchor bolts would shear off or blowout at a 5 mph collision speed.

The limitation is mostly the concrete to base plate connection. The IRC requires a 2500-3000 psi mix for garages, and garages are often of stronger mix, especially in freeze prone areas. The average garage concrete slab will fall within these specifications: 2500 - 4000 psi concrete with 5" min thickness. Using 1/2" epoxy anchors this equates to roughly a 2mph impact that could be sustained without significant damage to the bollard. This is aligned with a standard Uline 4.5" bollard with 1/8" wall thickness and a 8x8x3/8" base plate. More strength requires a larger base plate, as the limitation is the connection to the concrete.

The bolt down bollard specified in this proposal will take a 2000 lb impact, 24" off the ground with no damage, given 3000 psi concrete. More than 6" of permanent deflection would require a very significant force, and then only touching the face of the ESS. This seems a reasonable level of protection, and clearance distance.

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: Harrison, O. (2013). Evaluation of Collision Protection provided by vehicle impact bollards and propane cylinder exchange cabinets (Rep. No. 18.19083.01.107.FR1). Southwest Research Institute.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing code language, and aligns with the IFC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal because it gives some clarity and guidance on ESS impact protection in a garage from cars. Caution was given that creativity and field modifications were lost by putting in prescriptive items. (Vote: 8-2)

Final Hearing Results

RB161-22	AS

RB162-22

Original Proposal

IRC: SECTION R331 (New), R331.1 (New), R331.1.1 (New), R331.1.2 (New), R331.1.2.1 (New), R331.1.2.2 (New), R331.1.2.3 (New), R331.1.2.4 (New), R331.1.2.5 (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)

2021 International Residential Code

Add new text as follows:

SECTION R331 ALTERATIONS

R331.1 Alterations to an existing building. Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. *Alterations* shall not cause the *existing building* to become less compliant with the provisions of this code for new construction than the *existing building* was prior to the work.

R331.1.1 Alterations that decrease structural capacity. Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

R331.1.2 Alterations that increase structural loads. Where an *alteration* causes an increase in loads as described in this section, the existing structural components that support the increased load, including the foundation, shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8. Existing structural components that do not provide support for the increased loads shall not be required to comply with this section.

R331.1.2.1 Dead load increase. *Dead load* shall be considered to be increased for purposes of this section when the weight of materials used for the alteration exceeds the weight of the materials replaced, or when new materials or elements are added.

> **Exception:** Buildings in which the increase in dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.

R331.1.2.2 Live load increase. An increase in *live load* shall be determined based on Table R301.5.

R331.1.2.3 Snow load increase. Snow load shall be considered to be increased for purposes of this section when alteration of the roof configuration creates new areas that accumulate drifted snow.

R331.1.2.4 Wind load increase. Wind load shall be considered to be increased for purposes of this section when the surface area of any exterior elevation subject to wind pressure is increased by more than 5%.

R331.1.2.5 Seismic load increase. Seismic load shall be considered to be increased for purposes of this section where the actual dead load has increased by more than 5% in *existing buildings* assigned to Seismic Design Category C, D_0, D_1, or D_2 and subject to the seismic provisions of Section R301.2.2.

Reason: This proposal clarifies current IRC provisions as they apply to structural alterations of existing buildings within the scope of the

IRC. IRC Section R102.7.1 provides broad guidance for alterations but does not provide clear direction on how to apply this guidance in common and specific circumstances. Use of the IEBC is permitted but is not consistent with the intent of the IRC to function as a standalone code. This proposal facilitates use of the IRC as a standalone code for both new and existing buildings within the scope of the IRC.

The language used in this proposal has been laid out to be consistent with the IRC approach and to keep the intended users (not engineers) in mind. The alteration provisions have been separated into 2 conditions:

- A decrease in structural capacity
- An increase in the supported loads

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of existing, but ambiguous, rules already provided in Section R102.7.1.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
~~**SECTION R331 ALTERATIONS**~~

SECTION AJ109 ALTERATIONS

~~**AJ109.4 Structural.** The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.~~

~~**R331.1**~~ **<u>AJ109.4</u> Alterations to an existing building.** Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. *Alterations* shall not cause the *existing building* to become less compliant with the provisions of this code for new construction than the *existing building* was prior to the work.

~~**R331.1.1**~~ **<u>AJ109.4.1</u> Alterations that decrease structural capacity.** Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

~~**R331.1.2**~~ **<u>AJ109.4.2</u> Alterations that increase structural loads.** Where an *alteration* causes an increase in loads as described in this section, the existing structural components that support the increased load, including the foundation, shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8. Existing structural components that do not provide support for the increased loads shall not be required to comply with this section.

~~**R331.1.2.1**~~ **<u>AJ109.4.2.1</u> Dead load increase.** *Dead load* shall be considered to be increased for purposes of this section when the weight of materials used for the alteration exceeds the weight of the materials replaced, or when new materials or elements are added.

Exception<u>s</u>:

<u>1.</u> Buildings in which the increase in dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.

<u>2. Installation of rooftop-mounted *photovoltaic (PV) panel systems* weighing 4 pounds per square foot or less over an existing single layer of roof covering.</u>

~~**R331.1.2.2**~~ **<u>AJ109.4.2.2</u> Live load increase.** An increase in *live load* shall be determined based on Table R301.5.

~~**R331.1.2.3**~~ **<u>AJ109.4.2.3</u> Snow load increase.** Snow load shall be considered to be increased for purposes of this section when alteration of the roof configuration creates new areas that accumulate drifted snow.

~~**R331.1.2.4**~~ **<u>AJ109.4.2.4</u> Wind load increase.** Wind load shall be considered to be increased for purposes of this section when the surface area of any exterior elevation subject to wind pressure is increased by more than 5%.

~~R331.1.2.5~~ AJ109.4.2.5 Seismic load increase. Seismic load shall be considered to be increased for purposes of this section~~where the actual dead load has increased by more than 5%~~ in *existing buildings* assigned to Seismic Design Category C, D0, D1, or D2 ~~and subject to the seismic provisions of Section R301.2.2.~~where new materials replace lighter weight materials in one of the following conditions:

1. Concrete tile or tile roof covering of similar weight is installed on more than 50% of the total roof area.
2. Brick veneer or cladding of similar weight is installed on walls above the second story.

Committee Reason: The modification inclusive of AJ109.4 through AJ109.4.2.5 moves the section to the appendix and it fixes some issues with the existing structural loads. Another modification to AJ109.4.2.5 eliminates the 5% trigger for seismic upgrading and makes it easier for the code user. The modification for AJ109.4.2.1 makes sense with a lot of PV panels being placed on existing roofs. Some of the committee were concerned about potential confusion and misinterpretation of the two exceptions. The committee decided this proposal as modified is a good start to clarify structural alterations in the IRC provisions. In consideration of needed improvement, some of the committee preferred disapproval and resubmitting with appropriate modifications for public comment. (Vote: 6-4)

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., 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) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

AJ109.4 Alterations to an existing building. Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. *Alterations* shall not cause the *existing building* to become less compliant with the provisions of this code for new construction than the *existing building* was prior to the work.

AJ109.4.1 Decreased structural capacity ~~Alterations that decrease structural capacity~~. Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

AJ109.4.2 Increased design loads ~~Alterations that increase structural loads~~. Where an *alteration* causes an increase in loads as described in this section, the existing structural components that support the increased load, including the foundation, shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8. Existing structural components that do not provide support for the increased loads shall not be required to comply with this section.

AJ109.4.2.1 Dead load increase. *Dead load* shall be considered to be increased for purposes of this section when the weight of materials used for the alteration exceeds the weight of the materials replaced, or when new materials or elements are added.

Exceptions:

1. Buildings in which the increase in dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.
2. Installation of rooftop-mounted *photovoltaic (PV) panel systems* weighing 4 pounds per square foot or less over an existing single layer of roof covering.

These exceptions shall not be applied simultaneously.

AJ109.4.2.4 Wind load increase. Wind load shall be considered to be increased for purposes of this section when the exposed surface area of any exterior elevation subject to wind pressure is increased by more than 5%.

AJ109.4.2.5 Seismic load increase. Seismic load shall be considered to be increased for purposes of this section in *existing buildings* assigned to Seismic Design Category C, D_0, D_1, or D_2 where new materials replace lighter weight materials in one of the following conditions:

1. Concrete tile or tile roof covering of similar weight is installed on more than 50% of the total roof area.
2. Brick veneer or cladding of similar weight is installed on walls above the second story.

Commenter's Reason: This public comment clarifies specific points of concern that were raised in testimony during the code action hearings.
In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

https://www.cdpaccess.com/p/public-comment/3135/27714/files/download/3680/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx

This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB162, RB163, RB206, and RB297.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of existing, but ambiguous, rules already provided in Section R102.7.1. The public comment is editorial clean-up to address committee comments and the redirection to locate this in Appendix AJ.

Final Hearing Results

RB162-22	AMPC1

RB163-22

Original Proposal

IRC: SECTION R331 (New), R331.1 (New), R331.1.1 (New), R331.1.2 (New), R331.1.3 (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)

2021 International Residential Code

Add new text as follows:

SECTION R331
ADDITIONS

R331.1 Additions to an existing building. Where *existing buildings* with the addition are within the scope of the International Residential Code, additions shall comply with this section and other applicable provisions of this code. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section.

R331.1.1 Horizontal Attached Addition. Where an *addition* involves new construction next to and attached to an *existing building* and includes *alterations* to the *existing building*, the new construction shall meet all of the requirements of this code for new construction. Alterations to the *existing building* shall comply with the requirements governing alterations within this code. The addition structural components shall be connected to the *existing building* in accordance with accepted engineering practice.

Exception: In wood light-frame additions, connection of the structural components shall be permitted to be provided using wall top plates and addition studs that abut the *existing building*. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).

R331.1.2 Horizontal Detached Addition. Where an *addition* involves new construction next to an *existing building*, without structural alterations to the existing building, the *existing building* need not comply with the requirements of this code for new construction. The addition shall meet all of the requirements of this code for new construction and a minimum clear space not less than 6-inches shall be provided between the addition structural components and the *existing building*. Exterior and interior finish materials and non-structural framing infill shall be permitted to bridge the clear space between the addition and *existing building*. Existing foundations shall not be used to support the addition.

Exceptions:

1. At parallel wall lines between the *existing building* and the *addition*, the existing foundation is permitted to be altered to support the addition provided the modified foundation is designed in accordance with Section R301.1.3.
2. At parallel wall lines between the *existing building* and the *addition*, an existing window opening is permitted to be altered to create a shared door, provided there are no modifications to the existing wall framing above and beside the existing opening, or to the existing braced wall panels.

R331.1.3 Vertical Addition. Where an *addition* involves new construction that adds a story to any part of the *existing building* or vertically increases the height of any part of the *existing building*, the new construction and the existing building together shall meet all of the requirements of this code for new construction.

Reason: This proposal provides model prescriptive provisions for additions to existing buildings within the scope of the IRC. The current

governing language on existing IRC buildings (R102.7.1) leaves significant questions open to broad interpretation by the user and AHJ, which is clarified by these provisions. The language used in this proposal has been laid out to be consistent with the IRC approach and to keep the intended users (not engineers) in mind. This code change proposal does not add new requirements, but rather explains in more detail how the existing general requirements should be implemented.
The addition provisions have been separated into 3 conditions:

- Horizontal Attached Addition – additions that do rely on the existing structure for stability
- Horizontal Detached Addition – additions that do not rely on the existing structure for stability
- Vertical Addition – vertical additions that rely on the existing structure below to provide adequate support without failure or excessive deformation.

The model code that governs existing buildings (IEBC) includes multiple exceptions that allow the user to use the IRC for one- and two-family dwellings and townhouses. Once under IRC Section R102.7.1, questions arise on how to apply new code provisions to an existing structure, short of triggering a full upgrade or engaging a registered design professional. The ambiguity of R102.7.1 has resulted in AHJ's developing their own local amendments, to establish when existing conditions must be upgraded to comply with new code provisions.

<u>Note:</u>
A separate proposal has been submitted to create a new IRC Chapter 44 for Existing Buildings with new sections for existing provisions. If both proposals are approved, the sections proposed here would be relocated into Chapter 44 and appropriately renumbered.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification of existing, but ambiguous, rules already provided in R102.7.1.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal points everything in it to comply with the IRC including references to engineered design where appropriate, yet additions are already included under the scope of the IRC as stated in Section 102.7.1. Comment was made that the topic of detached additions is a topic not needed since detached structures can already be done under the IRC. The language of the latter part of the Vertical Addition section appears to require the existing building to meet all requirements of the IRC. Support for the proposal was expressed for the clarity and direction it gives on dealing with additions. Some felt this is a good start and encouraged modifications for the Public Comment Hearings.(Vote: 7-3)

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., 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) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

SECTION <u>AJ110</u> ~~R331~~ ADDITIONS

<u>AJ110.1</u> ~~R331.1~~ Additions to an existing building. Where *existing buildings* with the addition are within the scope of the International

Residential Code, additions shall comply with this section and other applicable provisions of this code. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section.

AJ110.2 ~~**R331.1.1**~~ **Structure for Horizontal Additions** ~~**Horizontal Attached Addition**~~**.** Where an *addition* involves new construction ~~next to and~~ attached to an *existing building* ~~and includes *alterations* to the *existing building*~~, the new construction shall meet all of the structural requirements of this code for new construction. Alterations to the *existing building* shall comply with the requirements governing alterations within this code. In wood light-frame additions, connection of the structural components shall be permitted to be provided using wall top plates and addition studs that abut the *existing building*. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).~~The addition structural components shall be connected to the *existing building* in accordance with accepted engineering practice~~.

> **Exception:** The addition structure shall be permitted to be connected to the *existing building* in accordance with accepted engineering practice.~~In wood light-frame additions, connection of the structural components shall be permitted to be provided using wall top plates and addition studs that abut the *existing building*. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).~~

~~**R331.1.2 Horizontal Detached Addition.** Where an *addition* involves new construction next to an *existing building*, without structural alterations to the existing building, the *existing building* need not comply with the requirements of this code for new construction. The addition shall meet all of the requirements of this code for new construction and a minimum clear space not less than 6-inches shall be provided between the addition structural components and the *existing building*. Exterior and interior finish materials and non-structural framing infill shall be permitted to bridge the clear space between the addition and *existing building*. Existing foundations shall not be used to support the addition.~~

> ~~**Exceptions:**~~
>
> 1. ~~At parallel wall lines between the *existing building* and the *addition*, the existing foundation is permitted to be altered to support the addition provided the modified foundation is designed in accordance with Section R301.1.3.~~
> 2. ~~At parallel wall lines between the *existing building* and the *addition*, an existing window opening is permitted to be altered to create a shared door, provided there are no modifications to the existing wall framing above and beside the existing opening, or to the existing braced wall panels.~~

AJ110.3 ~~**R331.1.3**~~ **Structure for Vertical Additions** ~~**Vertical Addition**~~**.** Where an *addition* involves new construction that adds a story to any part of the *existing building* or vertically increases the height of any part of the *existing building*, the new construction and the existing building together shall ~~meet all of the~~ be shown to comply with or altered to comply with all of the structural requirements of this code for new construction.

> **Exception**: Where the new structure and the existing structure together are evaluated in accordance with accepted engineering practice and are shown to be sufficient to support the combined loads from the new structure and existing structure, no structural alterations are required.

Commenter's Reason: Multiple questions were raised by the committee and opposition testimony, that highlighted differing interpretations of the originally proposed language. This public comment simplifies and clarifies the proposed language to address those points. The 2 primary changes are:
1- The horizontal addition provisions have been condensed into one section that uses prescriptive language in-line with the IRC practice. The language used in this public comment was developed in collaboration by all interested parties, including input from the Home Builders Association.

2 - Both the horizontal and vertical addition sections have been clearly limited in scope to structural requirements only. The original proposed language was more broad and encompassed all disciplines, which exceeded the intended purpose of this section.In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

https://www.cdpaccess.com/p/public-comment/3134/27715/files/download/3698/FEMA-IRC%20APP%20J%20compiled%2007-21-22.pdf

This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7,

RB162, RB163, RB206, and RB297.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
This proposal is a clarification of existing, but ambiguous, rules already provided in R102.7.1. However, the cost of construction will increase as a result of the more clear direction and ease of enforcing the more prescriptive requirements laid out herein.

Final Hearing Results

RB163-22	AMPC1

RB164-22

Original Proposal

IRC: R301.2.2.1, R401.4
Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, Washington State University, Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Residential Code

Revise as follows:

R301.2.2.1 Determination of seismic design category. Buildings shall be assigned a seismic design category in accordance with Figures R301.2.2.1(1)through R301.2.2.1(6)<u>, except as otherwise required by Section R401.4</u>.

R401.4 Soil tests. Where quantifiable data created by accepted soil science methodologies indicate *expansive soils, compressible soils*, shifting soils or other questionable soil characteristics are likely to be present, the *building official* shall determine whether to require a soil test to determine the soil's characteristics at a particular location. This test shall be done by an *approved agency* using an *approved* method. <u>Where soil testing is performed, the geotechnical report shall include the determination of the Site Class and the short-period spectral response acceleration, S_{DS}, in accordance with Section 1613 of the*International Building Code.* The *Seismic Design Category* shall be assigned in accordance with Table R301.2.2.1.1</u>.

Reason: In accordance with the seismic provisions of IBC Section 1613 and ASCE 7, sites with what the IRC describes as questionable soils would trigger the requirement for a site-specific site response analysis to identify the applicable Site Class and Seismic Design Category. For consistency with the IBC and ASCE 7, this proposal expands the already required geotechnical investigation to include determination of the Site Class and short-period spectral response acceleration, S_{DS}. Providing this information will help ensure that the correct Seismic Design Category is assigned, resulting in the seismic performance intended by the IRC. Once a geotechnical investigation is to be provided, it is a small increment in effort to make a determination of the Site Class and S_{DS}. This information is already very commonly included in geotechnical reports. To help direct the user to this provision, a pointed is added from Section R301.2.2.1 to Section R401.4.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will result in a small increase in cost of construction where a soil test is already required.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R401.4 Soil tests. Where quantifiable data created by accepted soil science methodologies indicate*expansive soils, compressible soils*, shifting soils or other questionable soil characteristics are likely to be present, the *building official* shall determine whether to require a soil test to determine the soil's characteristics at a particular location. This test shall be done by an *approved agency* using an *approved* method. Where <u>the *Seismic Design Category* in accordance with Section R301.2.2.1 is C or greater and where</u>soil testing is performed, the geotechnical report shall include the determination of the Site Class and the short-period spectral response acceleration, SDS, in accordance with Section 1613 of the *International Building Code.* The *Seismic Design Category* shall be assigned in accordance with Table R301.2.2.1.1.

Committee Reason: The committee decided that the modification limits the requirement for soil classification to Seismic Design Category

C or greater. As modified, the committee concluded that this proposal provides adequate information and consistency with the IBC and ASCE 7 by expanding the required geotechnical investigation to include determining the Site Class and short-period spectral response acceleration (Vote:10-0).

Final Hearing Results

RB164-22	AM

RB165-22

Original Proposal

IRC: R310.4.3, R401.4.1, TABLE R405.1, R403.3.3, TABLE R403.4, TABLE R404.1.1(1), TABLE R404.1.1(2), TABLE R404.1.1(3), TABLE R404.1.1(4), TABLE R404.1.2(2), TABLE R404.1.2(3), TABLE R404.1.2(4), TABLE R404.1.2(5), TABLE R404.1.2(6), TABLE R404.1.2(7), TABLE R404.1.2(8), R405.1, R506.2.2

Proponents: Gary Ehrlich, NAHB, NAHB (gehrlich@nahb.org)

2021 International Residential Code

Revise as follows:

R310.4.3 Drainage. Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R405.1.

Exception: A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, as detailed in Table R401.4.1(2) ~~R405.1~~.

R401.4.1 Geotechnical evaluation. In lieu of a complete geotechnical evaluation, the load-bearing values in Table R401.4.1(1) and the soil classifications in Table R401.4.1(2) shall be assumed.

TABLE R401.4.1(2) ~~R405.1~~ PROPERTIES OF SOILS CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL GROUP	UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOL	SOIL DESCRIPTION	USDA TEXTURAL SOIL CLASSIFICATION	DRAINAGE CHARACTERISTICS[a]	FROST HEAVE POTENTIAL	VOLUME CHANGE POTENTIAL EXPANSION[b]
Group I	GW	Well-graded gravels, gravel sand mixtures, little or no fines	N/A	Good	Low	Low
	GP	Poorly graded gravels or gravel sand mixtures, little or no fines	N/A	Good	Low	Low
	SW	Well-graded sands, gravelly sands, little or no fines	N/A	Good	Low	Low
	SP	Poorly graded sands or gravelly sands, little or no fines	Sand	Good	Low	Low
	GM	Silty gravels, gravel-sand-silt mixtures	N/A	Good	Medium	Low
	SM	Silty sand, sand-silt mixtures	Loamy Sand, Sandy Loam	Good	Medium	Low
Group II	GC	Clayey gravels, gravel-sand-clay mixtures	N/A	Medium	Medium	Low
	SC	Clayey sands, sand-clay mixture	Sandy Clay Loam, Sandy Clay	Medium	Medium	Low
	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Silt, Silt Loam	Medium	High	Low
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Loam, Clay Loam, Silty Clay Loam	Medium	Medium	Medium to Low
Group III	CH	Inorganic clays of high plasticity, fat clays	Clay, Silty Clay	Poor[c]	Medium	High
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	N/A	Poor[c]	High	High
Group IV	OL	Organic silts and organic silty clays of low plasticity	N/A	Poor[c]	Medium	Medium
	OH	Organic clays of medium to high plasticity, organic silts	N/A	Unsatisfactory[c]	Medium	High
	Pt	Peat and other highly organic soils	N/A	Unsatisfactory[c]	Medium	High

For SI: 1 inch = 25.4 mm.

a. The percolation rate for good drainage is over 4 inches per hour, medium drainage is 2 inches to 4 inches per hour, and poor is less than 2 inches per hour.

b. Soils with a low potential expansion typically have a plasticity index (PI) of 0 to 15, soils with a medium potential expansion have a PI of 10 to 35 and soils with a high potential expansion have a PI greater than 20.

c. Unsuitable as backfill material.

R403.3.3 Drainage. Final *grade* shall be sloped in accordance with Section R401.3. In other than Group I Soils, as detailed in Table R401.4.1(2) ~~R405.1~~, gravel or crushed stone beneath horizontal insulation below ground shall drain to daylight or into an*approved* sewer system.

TABLE R403.4 MINIMUM DEPTH (D) AND WIDTH (W) OF CRUSHED STONE FOOTINGS[a, b] (inches)
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 pound per square foot = 47.9 N/m^2.

a. Linear interpolation of stone depth between wall widths is permitted within each Load-Bearing Value of Soil (psf).

b. Crushed stone must be consolidated in 8-inch lifts with a plate vibrator.

c. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

TABLE R404.1.1(1) PLAIN MASONRY FOUNDATION WALLS[f]
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.

b. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

d. Solid indicates solid masonry unit; grout indicates grouted hollow units.

e. Wall construction shall be in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4), or a design shall be provided.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.1(2) 8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 5 INCHES[a, c, f]
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance,*d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2) ~~R405.1~~.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.1(3) 10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 6.75 INCHES[a, c, f]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in *Seismic Design Categories* A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 6.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2) ~~R405.1~~.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.1(4) 12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 8.75 INCHES[a, c, f]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 8.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2) ~~R405.1~~.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(2) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, g, h, i, j, k]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. NR indicates vertical wall reinforcement is not required, except for 6-inch-nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(3) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH (203 mm) NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(4) MINIMUM VERTICAL REINFORCEMENT FOR 10-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(5) MINIMUM VERTICAL WALL REINFORCEMENT FOR 6-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(6) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, f, h, i, j, k]
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 (420 MPa) and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is $L/240$, where L is the height of the basement wall in inches.

f. Interpolation shall not be permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(7) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH (152 mm) SCREEN-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]
Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer toTable R401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Sections R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of screen-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2(8) MINIMUM VERTICAL REINFORCEMENT FOR 6-, 8-, 10- AND 12-INCH NOMINAL FLAT BASEMENT WALLS[b, c, d, e, f, h, i, k, n, o]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to TableR401.4.1(2) ~~R405.1~~.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table R404.1.2(9).

d. NR indicates vertical wall reinforcement is not required, except for 6-inch nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

e. Allowable deflection criterion is *L*/240, where *L* is the unsupported height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. Vertical reinforcement shall be located to provide a cover of $1^1/_4$ inches measured from the inside face of the wall. The center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness or $^3/_8$ inch.

i. Concrete cover for reinforcement measured from the inside face of the wall shall be not less than$^3/_4$ inch. Concrete cover for reinforcement measured from the outside face of the wall shall be not less than $1^1/_2$ inches for No. 5 bars and smaller, and not less than 2 inches for larger bars.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. Concrete shall have a specified compressive strength, f'_c, of not less than 2,500 psi at 28 days, unless a higher strength is required by Note l or m.

l. The minimum thickness is permitted to be reduced 2 inches, provided that the minimum specified compressive strength of concrete, f'_c, is 4,000 psi.

m. A plain concrete wall with a minimum nominal thickness of 12 inches is permitted, provided that the minimum specified compressive strength of concrete, f'_c, is 3,500 psi.

n. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

o. The use of this table shall be prohibited for soil classifications not shown.

R405.1 Concrete or masonry foundations. Drains shall be provided around concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below *grade*. Drainage tiles, gravel or crushed stone drains, perforated pipe or other *approved* systems or materials shall be installed at or below the top of the footing or below the bottom of the slab and shall discharge by gravity or mechanical means into an *approved* drainage system. Gravel or crushed stone drains shall extend not less than 1 foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing and be covered with an *approved* filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper. Except where otherwise recommended by the drain manufacturer, perforated drains shall be surrounded with an *approved* filter membrane or the filter membrane shall cover the washed gravel or crushed rock covering the drain. Drainage tiles or perforated pipe shall be placed on not less than 2 inches (51 mm) of washed gravel or crushed rock not less than one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material.

Exception: A drainage system is not required where the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I soils, as detailed in Table R401.4.1(2) ~~R405.1~~.

R506.2.2 Base. A 4-inch-thick (102 mm) base course consisting of clean graded sand, gravel, crushed stone, crushed concrete or crushed blast-furnace slag passing a 2-inch (51 mm) sieve shall be placed on the prepared subgrade where the slab is below *grade*.

Exception: A base course is not required where the concrete slab is installed on well-drained or sand-gravel mixture soils classified as Group I according to the United Soil Classification System in accordance with Table R401.4.1(2) ~~R405.1~~.

Reason: This proposal accomplishes three things. First, it relocates existing IRC Table R405.1 to Section R401.4.1. The soil classifications in the table are referred to repeatedly throughout IRC Section R401 and R402, yet somehow the user must flip all the way to Section R405 to find where the classifications are defined.
Secondly, a column is added providing U.S. Department of Agriculture (USDA) soil classifications in addition to the traditional Unified Soil Classification System (USCS) soil classifications. This provides a readily accessible resource which can be referenced if a geotechnical investigation is not being done, which is often the case in residential projects as such investigations can be cost-prohibitive. In the absence of a geotechnical investigation, enabling the use of the USDA data and textural descriptions may help ensure builders select a proper soil classification which is used to size footings based on assumed bearing pressures and determine foundation wall thickness and reinforcing. The latter is especially critical as assuming a higher quality soil than is actually present could lead to a foundation wall failure, creating a life safety issue.

The U.S. Army Corps of Engineers Engineer Research and Development Center conducted a study in 2015 to develop a consensus methodology for relating the USCS system to the USDA classification scheme. The USACE study compiled data from six soil databases containing thousands of soil samples with recorded properties, including water capacity, soil reaction, electrical conductivity, textural class, PH, salinity, clay fraction, and sand fraction. Using these records USASCE was able to identify samples classified under both the USDA and UCSC systems, determine the frequency of USDA classified soils occurring in the various UCSC categories, and reach a consensus scheme mapping between USDA soil types and USGS soil classifications. It is noted the mapping scheme does not apply to gravelly soils or to organic soils.

Lastly, a new footnote "c" is added to clarify certain soil types are unsuitable for backfill due to their poor drainage characteristics. A similar footnote appears in the IBC.

Bibliography:

García-Gaines, R. A., & Frankenstein, S. (2015). *USCS and the USDA Soil Classification System, Development of a Mapping Scheme*. Vicksburg, MS: U.S. Army Engineer Research and Development Center. Accessed at https://erdc-library.erdc.dren.mil/jspui/bitstream/11681/5485/1/ERDC-CRREL-TR-15-4.pdf.

Cost Impact: The code change proposal will increase the cost of construction
The proposal will increase the cost of construction where use of the USDA textural soil classifications leads to an identification of soils with less stiffness or lower drainage characteristics than what would have previously been assumed, resulting in additional foundation wall thickness, additional foundation wall reinforcing, or wider footing widths. Conversely, a cost savings may occur if better soil conditions are identified. Further, a geotechnical investigation typically costs around $1,000-$1,500 for a single-family dwelling project. Additional savings could accrue to the builder and homeowner if consideration of the USDA data suggests a site-specific investigation is not necessary.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee indicated that the proposal adds information to the table and provides a new tool for soil classification by adding a column for USDA texture soil classification. However, some of the committee members who voted in opposition have concern that the Bibliography includes only one study and hoped for a deeper look by soil engineers to see more evidence. In addition, some of the existing Unified Soil Classification System (USCS) in the table do not have any classification under the newly added USDA texture soil classification (N/A), which is concerning (Vote 6-5).

Final Hearing Results

RB165-22	AS

RB166-22

Original Proposal

IRC: R403.1.1, R403.5 (New), FIGURE R403.5(1) (New), FIGURE R403.5(2) (New)

Proponents: Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com)

2021 International Residential Code

Revise as follows:

R403.1.1 Minimum size. The minimum width, W, and thickness, T, for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable, but not less than 12 inches (305 mm) in width and 6 inches (152 mm) in depth. The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Footing projections, P, shall be not less than 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). Footings for precast foundations shall be in accordance with the details set forth in Section R403.4, Table R403.4, and Figures R403.4(1) and R403.4(2). Crushed stone footings for masonry or cast-in-place concrete foundations shall be in accordance with Section R403.5.

Add new text as follows:

R403.5 Crushed stone footings for cast-in-place foundations. Crushed stone footings for masonry or cast-in-place concrete foundations complying with Section R404.1 shall comply with Section R403.4.1 except they shall be installed in accordance with Figures R403.5(1) or R403.5(2).

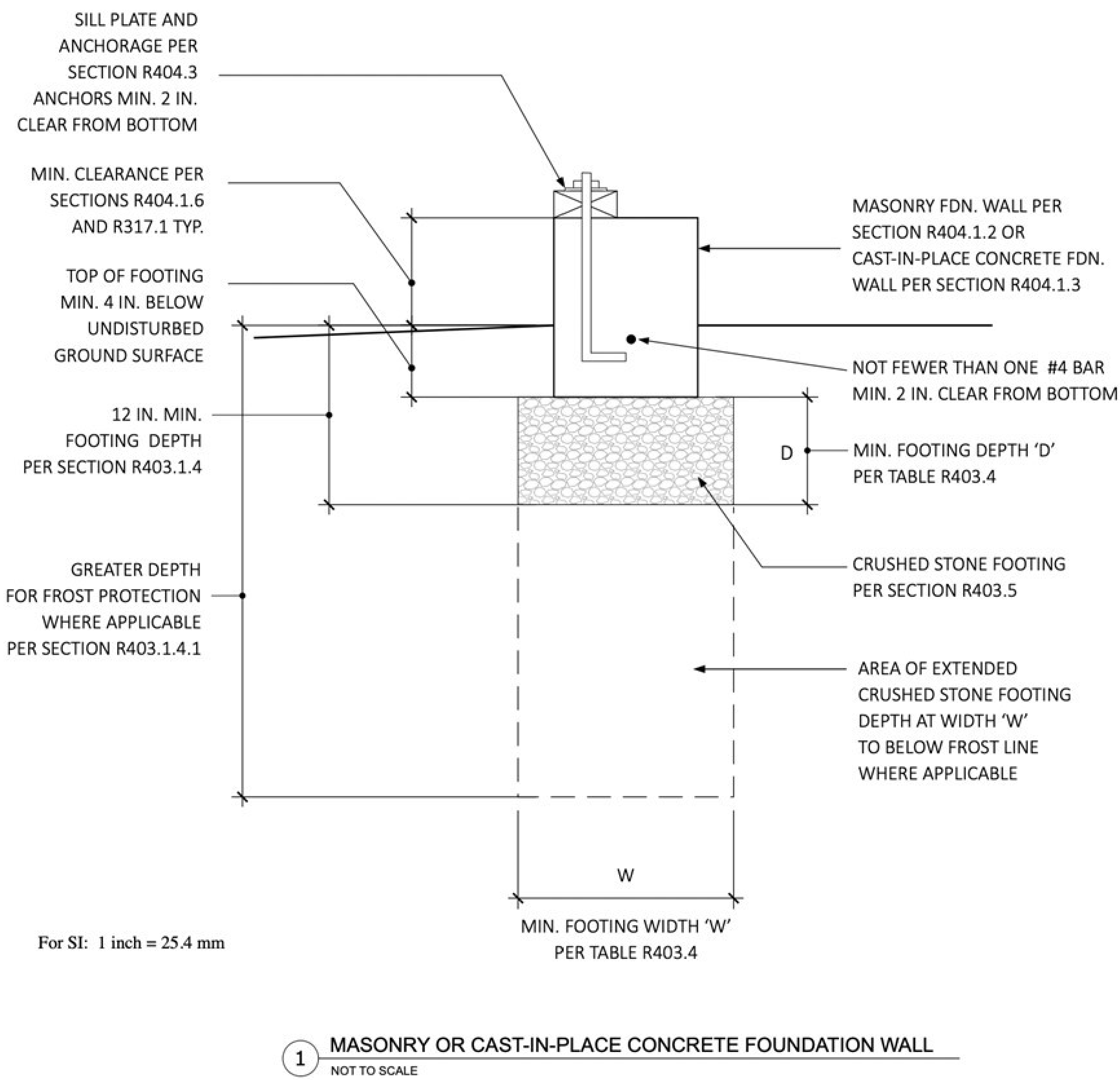


FIGURE R403.5
CRUSHED STONE FOOTINGS
FOR CAST-IN-PLACE FOUNDATIONS
IN SEISMIC DESIGN CATEGORIES A, B, AND C

FIGURE R403.5(1) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C - MASONRY OR CAST-IN-PLACE CONCRETE FOUNDATION WALL

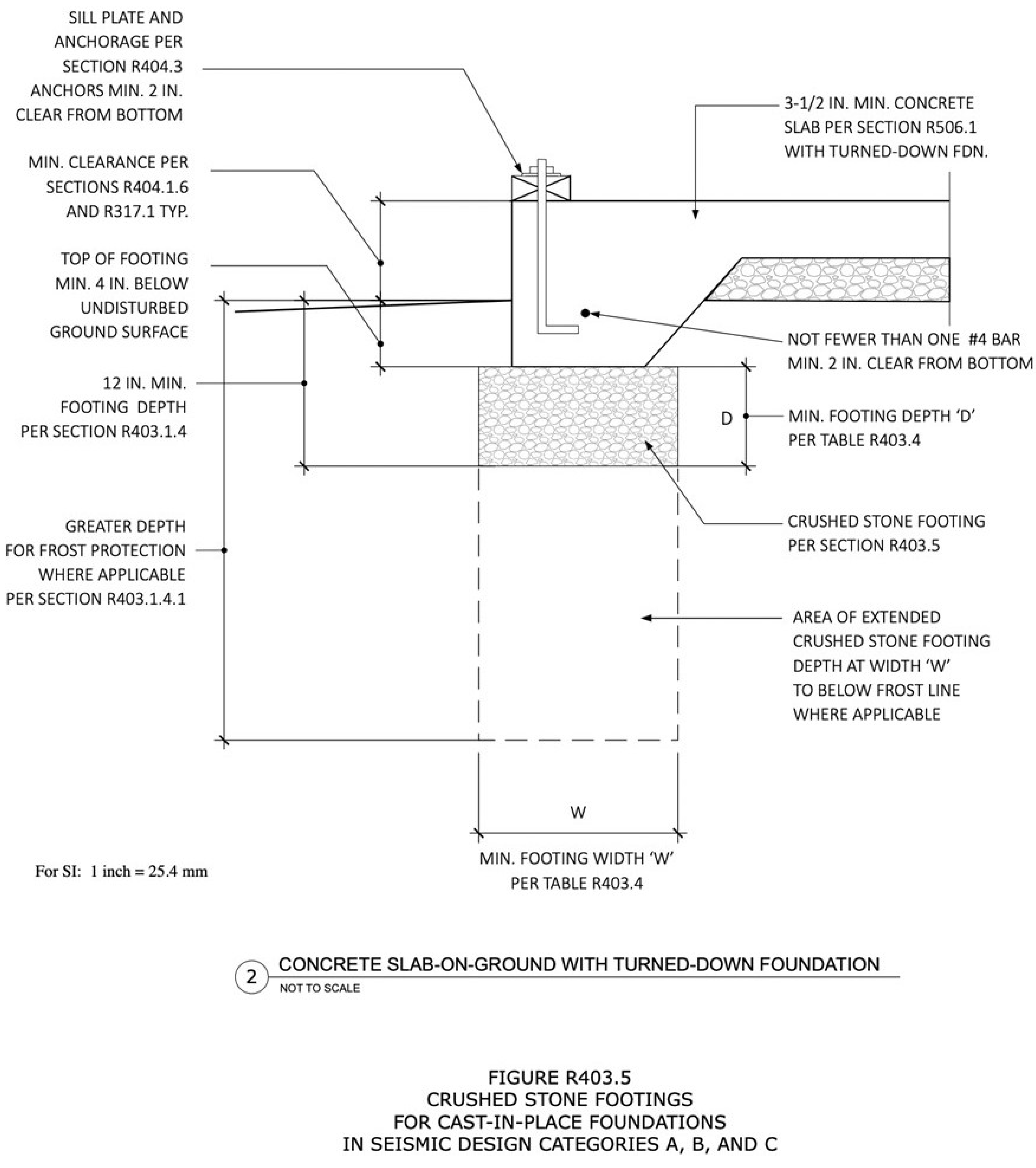


FIGURE R403.5(2) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C - CONCRETE SLAB-ON-GROUND WITH TURNED DOWN FOUNDATION

Reason: Crushed stone footings for wood foundations and precast concrete foundations are currently permitted in IRC Sections R403.2 and R403.4.1 respectively. There is also the well-established geotechnical practice of using crushed stone underlayment for foundations of all types. This proposal simply allows these provisions to also be used for masonry foundations and cast-in-place concrete foundations.

This proposal uses identical requirements for crushed stone and its placement as those for analogous pre-cast concrete foundations in Section R403.4.1 (by reference), and for footing width and depth in the associated Table R403.4. The proposal limits the proposed use of crushed stone to Seismic Design Categories A, B, and C, by reference as stated in Section R403.4.1. New Figures R403.5(1) and (2) illustrate the requirements, including minimums regarding the top of the footing relative to undisturbed ground surface. The Figures illustrate two conditions for crushed stone footings: 1) masonry or concrete wall foundation, and 2) slab-on-ground with turned down foundation. Conservatively, not less than one #4 bar is required for these foundations over a crushed stone footing. This isnot currently required for plain concrete footings or turned-down footings in Seismic Design Categories A, B, and C. Minimum clearances for the #4 bar and the sill plate anchor are also stated in the Figures.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal adds a less material-intensive, less labor-intensive and therefore less expensive foundation option, by allowing the use of crushed stone instead of concrete for footings in some situations.

Public Hearing Results

Committee Action	**Disapproved**

Committee Reason: The proposal addresses requirements for crushed stone footings for masonry or cast-in-place concrete foundations. The committee determined that the proposal requires an engineering design while the IRC includes prescriptive provisions. Therefore, the committee suggested that the proponent look into prescriptive provisions and cooperate with FEMA. The committee was also concerned about potential issues with drainage and stabilization (10-0).

Public Comments

Public Comment 1

Proponents: Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, DCAT (strawnet@gmail.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R403.1.1 Minimum size. The minimum width, W, and thickness, T, for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable, but not less than 12 inches (305 mm) in width and 6 inches (152 mm) in depth. The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Footing projections, P, shall be not less than 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). Footings for precast foundations shall be in accordance with the details set forth in Section R403.4, Table R403.4, and Figures R403.4(1) and R403.4(2). Crushed stone footings for ~~masonry or~~ cast-in-place concrete foundations shall be in accordance with Section R403.5.

R403.5 Crushed stone footings for cast-in-place concrete foundations. Crushed stone footings ~~for masonry or cast-in-place concrete foundations complying~~in accordance with Section R403.4.1 shall ~~comply~~be permitted for non-retaining cast-in-place concrete foundations complying with Section ~~R404.1~~ R404.1.3 and this section ~~except they~~.The footing and foundation wall shall be installed in accordance with Figure~~s~~ R403.5(1)~~,~~ or Figure R403.5(2) and Table R403.5, or Figure R403.5(3). Crushed stone footings for cast-in-place concrete foundations shall be permitted for townhouses in Seismic Design Categories A and B and one- and two-family dwellings in Seismic Design Categories A, B and C.

TABLE R403.5 MINIMUM CAST-IN-PLACE CONCRETE FOUNDATION WALL DIMENSIONS, REINFORCEMENT, AND MAXIMUM BRACED WALL LINE SPACING

WIND EXPOSURE CATEOGRY	ULTIMATE DESIGN WIND SPEED (MPH)	MIN. STEM WALL WIDTH (IN.)	MIN. STEM WALL HEIGHT (IN.)	MIN. HORIZONTAL REBAR	MAX. BRACED WALL LINE SPACING (FT.)
B	< 140	6	12	(2) - #4	28
C and D	< 140	8	18	(3) - #4	25

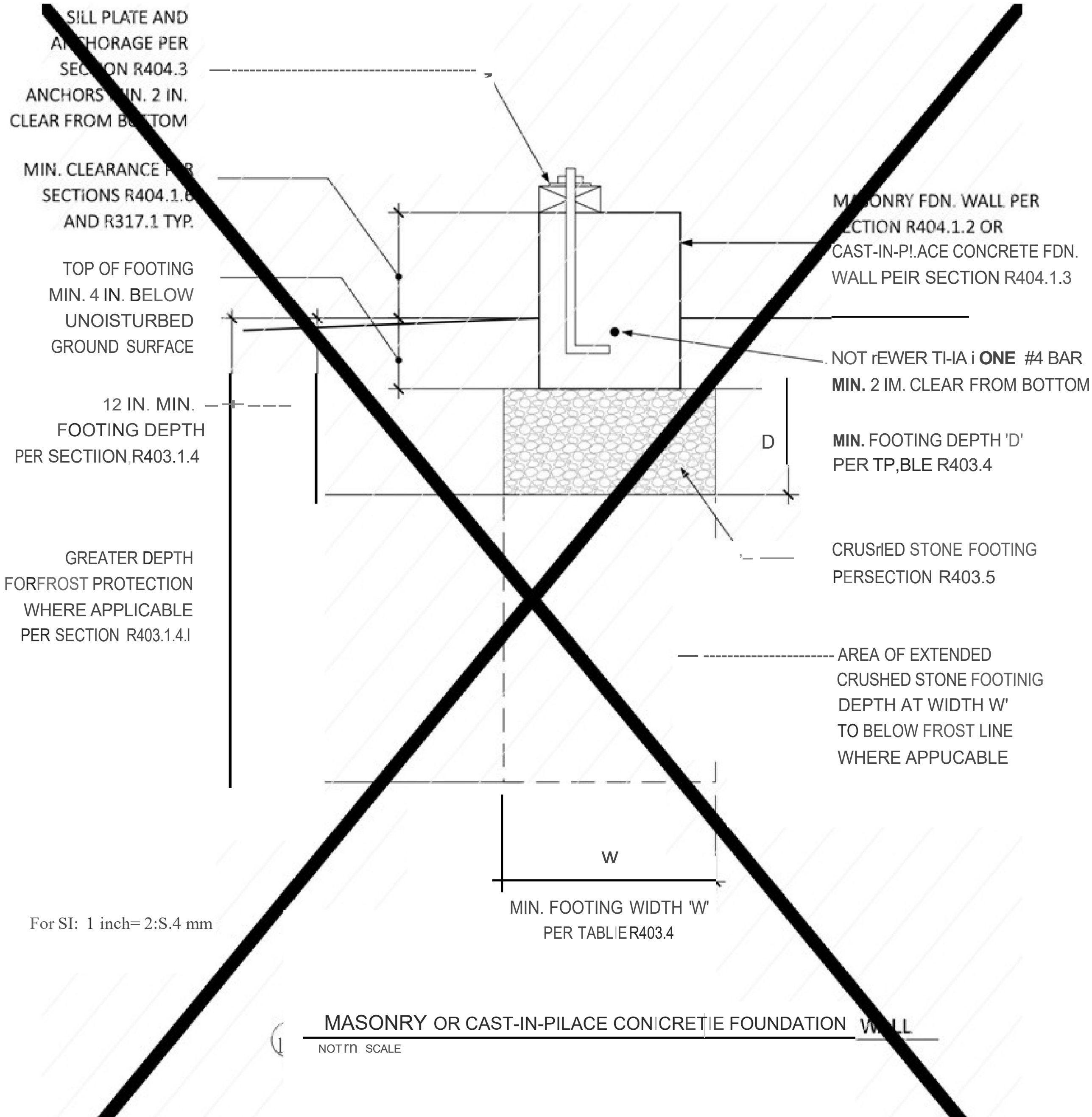
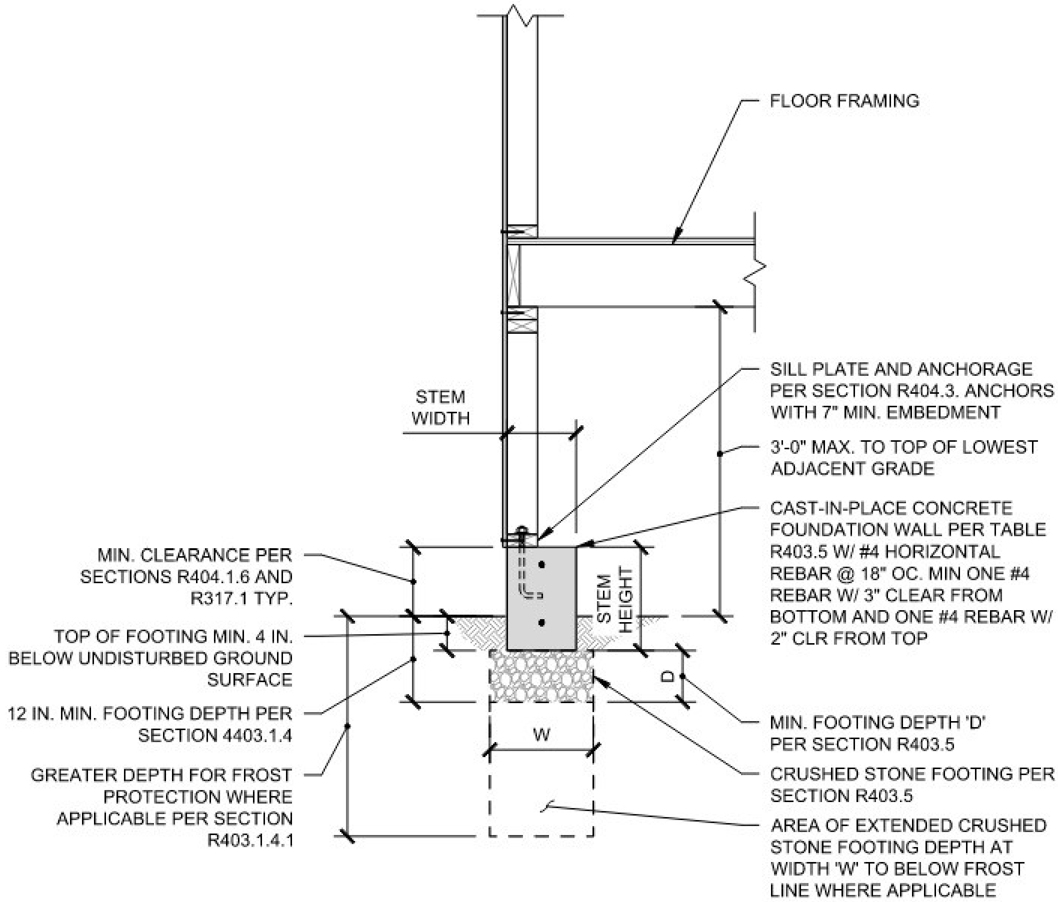


FIGURE R403.S
CRUSHED STONE FOOTINiGS
FOR CAST-IN-PLACE FOUNDATIONS
IN SEISMIC DESIGN CATEGORIES A, B, AND C

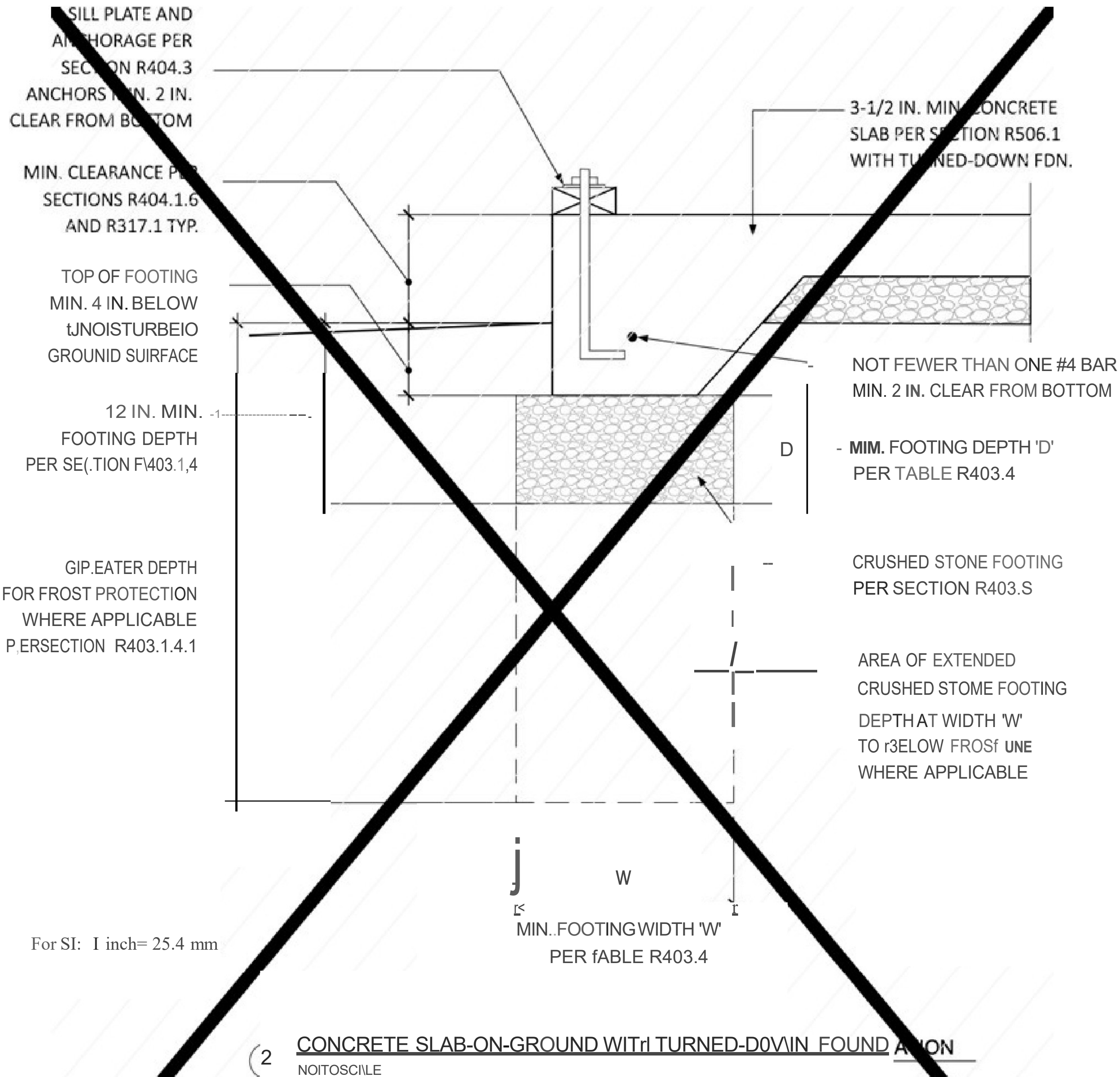


For SI: 1 inch = 25.4 mm

1 CAST-IN-PLACE CONCRETE FOUNDATION WALL W/ WOOD CRIPPLE WALL

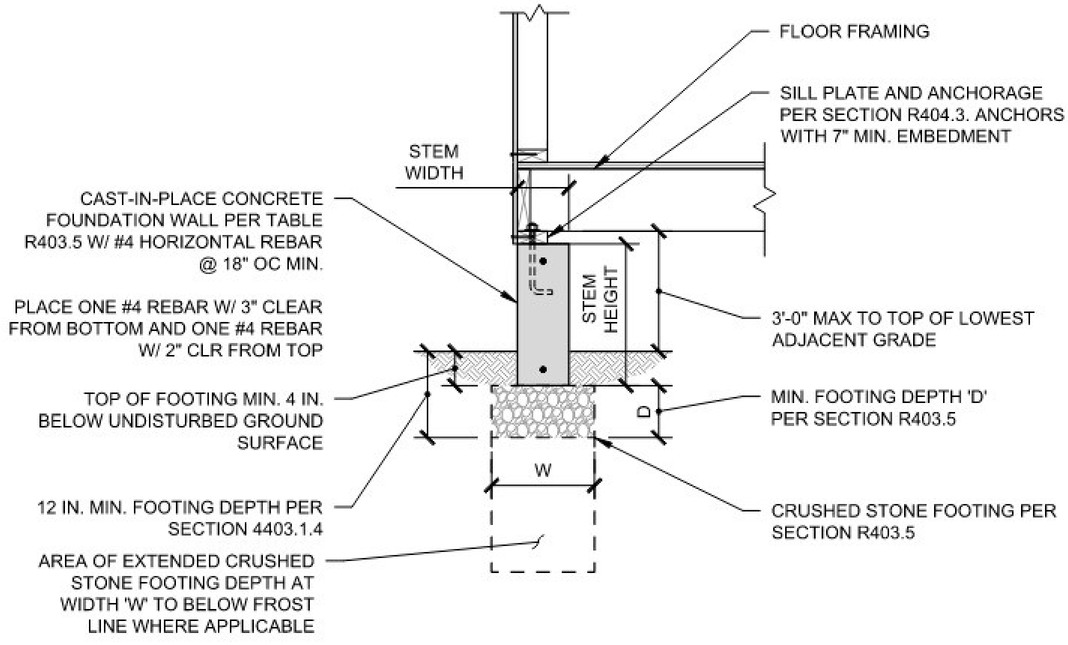
NOT TO SCALE

FIGURE R403.5(1) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE CONCRETE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C AND WIND EXPOSURE CATEGORIES B, C, AND D - CAST-IN-PLACE CONCRETE FOUNDATION WALL WITH WOOD CRIPPLE WALL



For SI: I inch= 25.4 mm

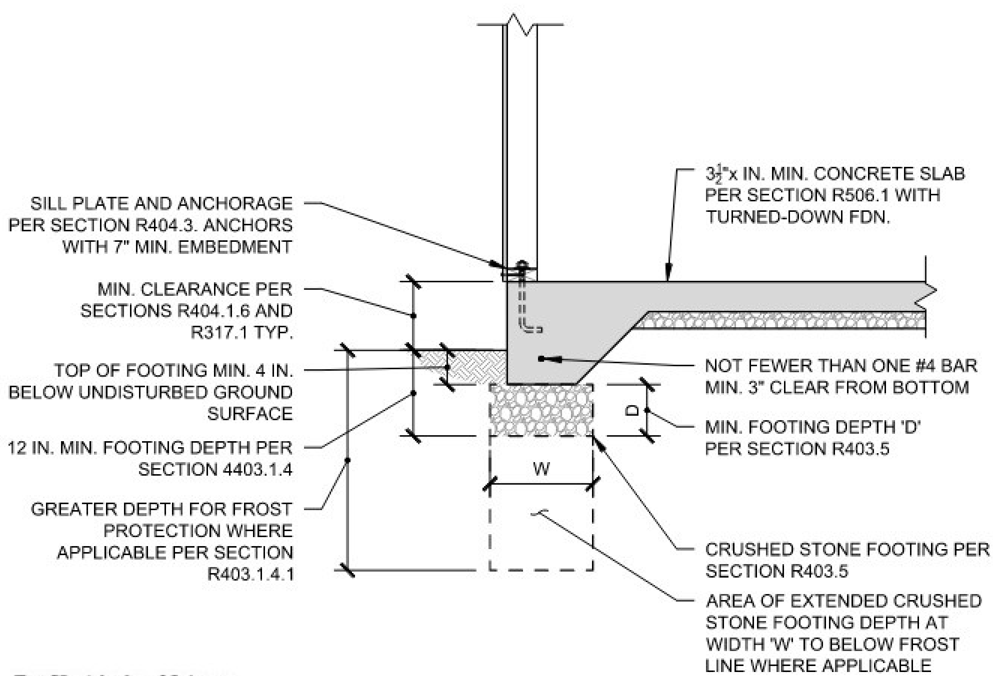
FiGURE R403.5
CRUSHED STONE FOOTIli\IGS
FOR CAST-IN-PLACE FOUNDATIONS
IN SEISMIC DESIGN CATEGORIES A, B, AND C



For SI: 1 inch = 25.4 mm

2 CAST-IN-PLACE CONCRETE FOUNDATION W/ NO CRIPPLE WALL NOT TO SCALE

FIGURE R403.5(2) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE CONCRETE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C AND WIND EXPOSURE CATEGORIES B, C, AND D - ~~CONCRETE SLAB-ON-GROUND WITH TURNED DOWN FOUNDATION~~ CAST-IN-PLACE CONCRETE FOUNDATION WALL WITH NO CRIPPLE WALL ABOVE



For SI: 1 inch = 25.4 mm

3 CONCRETE SLAB-ON-GROUND W/ TURNED-DOWN FOUNDATION NOT TO SCALE

R403.5(3) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE CONCRETE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A,

B, AND C AND WIND EXPOSURE CATEGORIES B, C, AND D - CONCRETE SLAB-ON-GROUND WITH TURNED DOWN FOUNDATION

Commenter's Reason: Crushed stone footings for wood foundations and precast concrete foundations are currently permitted in IRC Sections R403.2 and R403.4.1 respectively. Proposal RB166 as modified by this Public Comment simply allows these provisions with similar or greater limitations to be used for cast-in-place concrete foundation walls and concrete slabs with turned-down foundations. This Public Comment maintains key aspects of the original proposal, while making modifications that address concerns expressed in CAH testimony or by IRC Committee comments, or that further limit its use.

A. Key Aspects of the Original Proposal Maintained:

1. Like the original proposal the modified proposal uses identical requirements for crushed stone and its placement as those for analogous pre-cast concrete foundations in Section R403.4.1 (by reference), and for footing width and depth in the associated Table R403.4.

2. Conservatively, #4 bars are required for cast-in-place foundation walls over a crushed stone footing and turned-down foundations for slabs. Minimum clearances and quantities for the #4 bars and embedment for the sill plate anchors are stated in the Figures. By comparison, no reinforcing is currently required in the IRC for plain concrete footings and their foundation walls, or turned-down foundations in Seismic Design Categories A, B, and C.

3. Limited to use for one- and two-family dwellings in Seismic Design Categories A, B, and C.

B. Public Comment Modifications Addressing Concerns Expressed at the CAH:

1. Limited to use for townhouses in Seismic Design Categories A, B, consistent with the split in Section R301.2.2. (An appropriate clarification suggested by FEMA representatives.)

2. For non-retaining use only. (An appropriate limitation identified by FEMA representatives.)

3. The prescribed stem walls have been analyzed for resistance to out-of-plane wind and seismic design loads and their lateral span limits between perpendicular braced wall lines and their associated foundations. The maximum spacing of perpendicular braced wall lines is listed in the newly proposed Table R403.5. (Addresses the out-of-plane resistance concern raised by FEMA representatives.) (See https://verdantstructural.com/RB166-22-crushed-stone-footing-calculation-packet.pdf for supporting calculations.)

4. The provisions are now entirely prescriptive, no longer requiring an engineered design. (The engineered design requirement, added as a floor modification at the CAH to address FEMA representatives' concerns that are now addressed in this Public Comment, was a primary reason the IRC Committee disapproved RB166. The IRC's stated purpose is to provide prescriptive requirements.)

C. Improvements or Additional Limitations:

1. New or revised Figures R403.5(1), (2), and (3) illustrate the requirements of these provisions, referencing applicable section numbers. The Figures illustrate three conditions: (1) concrete foundation wall with a cripple wall (added with this Public Comment), (2) concrete foundation wall with no cripple wall, and (3) concrete slab-on-ground with turned-down foundation.

2. Removes masonry foundation walls, therefore is allowed for cast-in-place concrete foundation walls only.

The foundation drainage concern expressed by an IRC Committee member was explained in CAH proponent testimony. That is, the same requirements in the IRC for other foundation and footing systems apply to this crushed stone footing use. More specifically, foundation drainage in the IRC is required only for ". . . foundations that retain earth and enclose habitable or usable spaces located below grade." (Section R405.1). This Public Comment and Proposal allow neither. However, crushed stone footings provide potential beneficial use as a foundation drainage medium, as alluded to in some subsections of Section R405.1.

Bibliography: https://verdantstructural.com/RB166-22-crushed-stone-footing-calculation-packet.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This Proposal allows the less material-intensive, less labor-intensive and therefore less expensive footing option of crushed stone instead of concrete for cast-in-place foundation walls, though this cost savings is partly offset by required reinforcing steel in the foundation wall or turned-down foundation of a slab.

Final Hearing Results

RB166-22 AMPC1

RB167-22

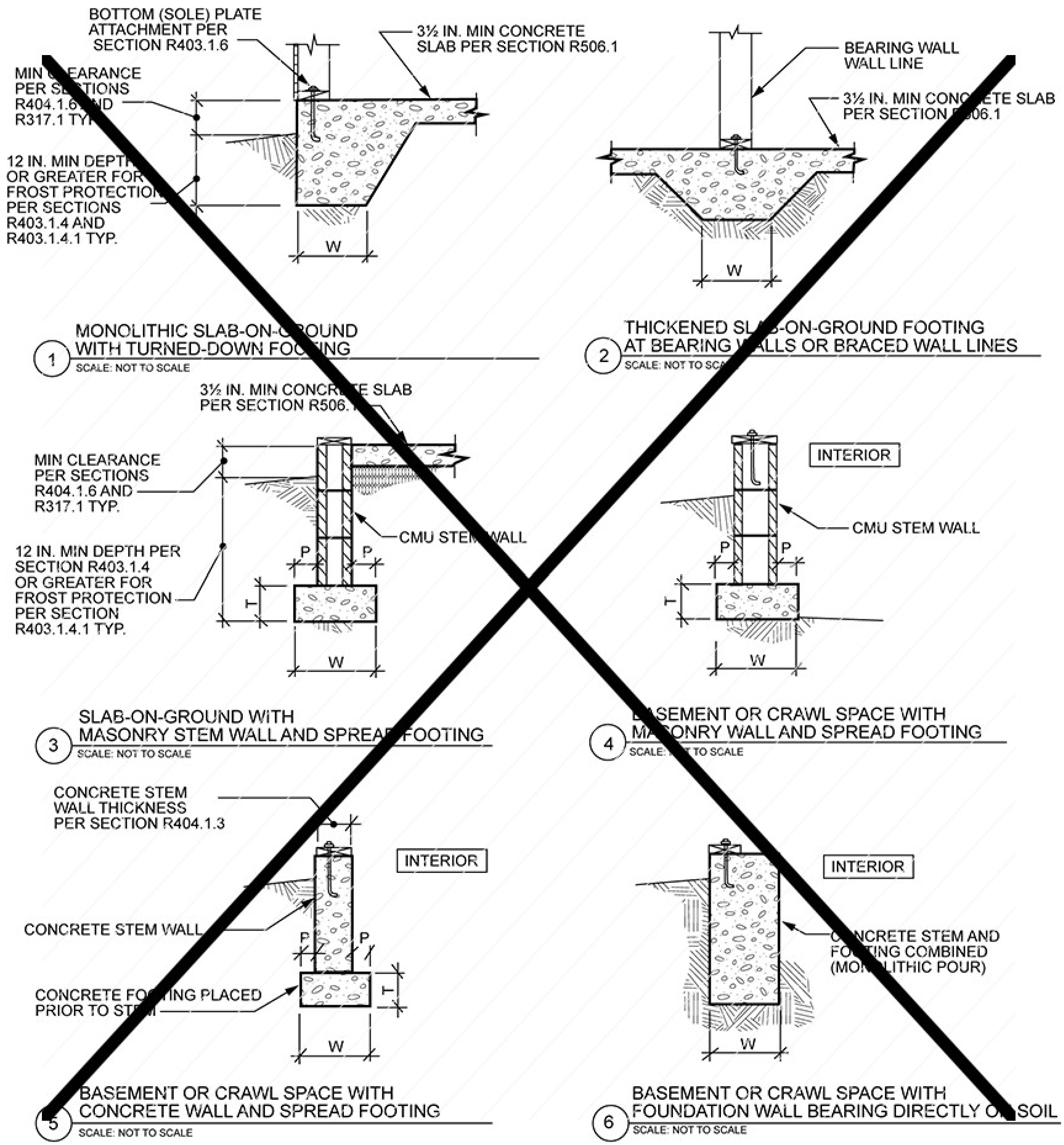
Original Proposal

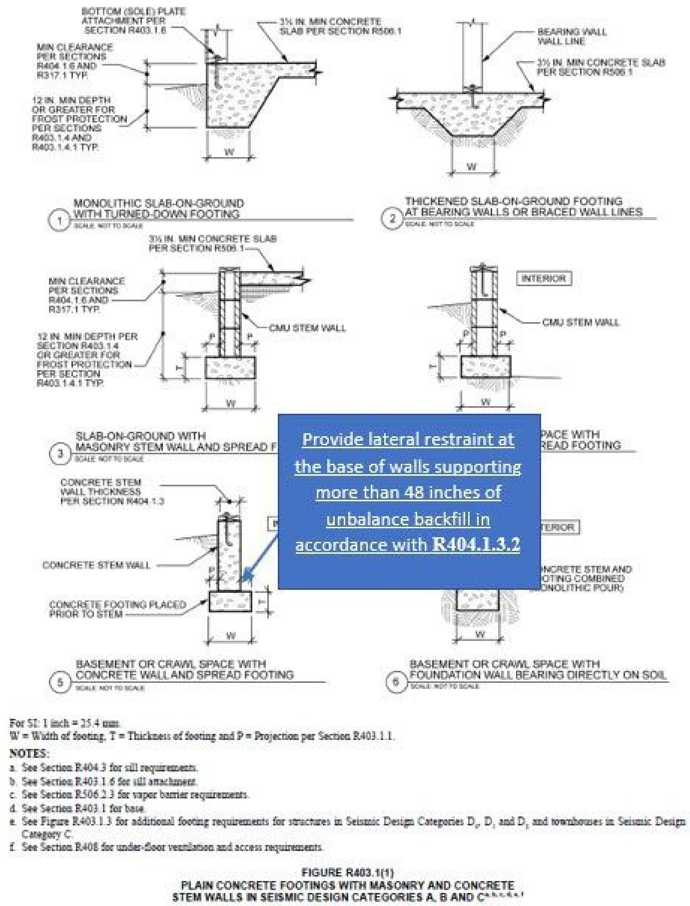
IRC: FIGURE R403.1(1)

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

2021 International Residential Code

Revise as follows:





For SI: 1 inch = 25.4 mm.

W = Width of footing, T = Thickness of footing and P = Projection per Section R403.1.1.

a. See Section R404.3 for sill requirements.

b. See Section R403.1.6 for sill attachment.

c. See Section R506.2.3 for vapor barrier requirements.

d. See Section R403.1 for base.

e. See Figure R403.1.3 for additional footing requirements for structures in Seismic Design Categories D_0, D_1 and D_2 and townhouses in Seismic Design Category C.

f. See Section R408 for under-floor ventilation and access requirements.

FIGURE R403.1(1) PLAIN CONCRETE FOOTINGS WITH MASONRY AND CONCRETE STEM WALLS IN SEISMIC DESIGN CATEGORIES A, B AND C[a, b, c, d, e, f]

Reason: All basement walls tables assumed the wall is laterally supported at the top and bottom. See foot notes in all concrete walls tables. Footnote g. states “Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling”. R403.1.1 Minimum size for footing reference Figure R403.1(1). Figure R403.1(1) does not show any connection requirements. This proposal gives options for footing to wall connections in FIGURE R403.1(1) by adding a pointer states “Provide lateral restraint at the base of walls supporting more than 48 inches of unbalance backfill in accordance with R404.1.3.2”.
This lateral restraint can be provided by a keyway, footing dowels, or by a slab-on-ground poured against the base of the wall.

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 clarifies the requirements in the current code text. All basement walls tables assumed the wall is laterally supported at the top and bottom. This proposal clarifies the options for connections. There is no change in the cost since this is based on the current practice.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee indicated that the proposal provides guidance and clarification for the figure by adding a pointer that states, “Provide lateral restraint at the base of walls supporting more than 48 inches of unbalanced backfill in accordance with R404.1.3.2”. It is essential to clarify the connection requirements to the code users. The committee also wants the proponent to consider looking into the CMU wall section and see if clarification is needed (Vote:6-4).

Final Hearing Results

RB167-22	AS

RB168-22

Original Proposal

IRC: TABLE R404.1.1(1)

Proponents: Gary Ehrlich, NAHB, NAHB (gehrlich@nahb.org)

2021 International Residential Code

Revise as follows:

TABLE R404.1.1(1) PLAIN MASONRY FOUNDATION WALLS[f]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes and lateral soil load[b] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, MH, ML-CL and inorganic CL soils 60
5	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
6	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
	6	8	10	12
7	4	6 solid[d] or 8	8	8
	5	6 solid[d] or 8	10	10
	6	10	12	10 solid[d]
	7	12	10 solid[d]	12 solid[d]
8	4	6 solid[d] or 8	6 solid[d] or 8	8
	5	6 solid[d] or 8	10	12
	6	10	12	12 solid[d]
	7	12	12 solid[d]	Note e
	8	10 grout[d]	12 grout[d]	Note e
9	4	6 grout[d] or 8 solid[d] or 12	6 grout[d] or 8 solid[d]	8 grout[d] or 10 solid[d]
	5	6 grout[d] or 10 solid[d]	8 grout[d] or 12 solid[d]	8 grout[d]
	6	8 grout[d] or 12 solid[d]	10 grout[d]	10 grout[d]
	7	10 grout[d]	10 grout[d]	12 grout
	8	10 grout[d]	12 grout	Note e
	9	12 grout	Note e	Note e

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.

b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

d. Solid indicates solid masonry unit; grout indicates grouted hollow units.

e. Wall construction shall be in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4), or a design shall be provided.

f. The use of this table shall be prohibited for soil classifications not shown.

Reason: This proposal revises the header of Table R404.1.1(1) on Plain Masonry Foundation Walls to match the rest of the foundation reinforcing tables. Every other table for masonry or concrete walls in Chapter 4 provides the lateral soil load associated with the soil classes, but somehow over various revisions to Table R404.1.1(1) the header was not coordinated. This change will make the table consistent with Tables R404.1.1(2)-(4) and Tables R404.1.2(2)-(8).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is editorial and provides consistency with the other foundation wall tables in Chapter 4. The specified design lateral soil loads are those used in developing the table, so there is no change to the technical requirements. Therefore, there is no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies the header of Table R404.1.1(1) on plain masonry foundation walls to match the rest of the foundation tables by adding the lateral soil load associated with the soil classes (Vote:10-0).

Final Hearing Results

RB168-22	AS

RB169-22

Original Proposal

IRC: R403.1.2, TABLE R403.1.2 (New)

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org)

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Revise as follows:

R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. Exterior walls of buildings located in *Seismic Design Categories* D_0, D_1 and D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice. ~~Required interior *braced wall panels* in buildings located in *Seismic Design Categories* D_0, D_1 and D_2 with plan dimensions greater than 50 feet (15 240 mm) shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4, except for two-story buildings in Seismic Design Category D_2, in which all *braced wall panels*, interior and exterior, shall be supported on continuous foundations.~~

> ~~**Exception:** Two-story buildings shall be permitted to have interior *braced wall panels* supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:~~
>
> 1. ~~The height of cripple walls does not exceed 4 feet (1219 mm).~~
> 2. ~~First-floor *braced wall panels* are supported on doubled floor joists, continuous blocking or floor beams.~~
> 3. ~~The distance between bracing lines does not exceed twice the building width measured parallel to the *braced wall line*.~~

Add new text as follows:

TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

PLAN DIMENSIONS	1-STORY						2-STORY					
	50 feet or less			> 50 feet			50 feet or less			> 50 feet		
SDC	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2
Exterior Brace Wall Panel												
Continuous Footings	R	R	R	R	R	R	R	R	R	R	R	R
Interior Brace Wall Panel												
Continuous Footings	NR	NR	NR	R[a]	R[a]	R[a]	NR	NR	R[a]	R[a]	R[a]	R[a]

R = Continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4 required.

NR = Continuous footings not required.

a. NR when the following conditions are all met:
   1. The height of cripple walls does not exceed 4 feet (1219 mm).
   2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
   3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

Reason: Section R403.1.2 contains exceptions over exceptions and is confusing with various possible interpretations. The intent of this change proposal is to tabulate the provision in the new Table R403.1.2 without changing the intent of the existing provisions. Please note that Footnote (1) to Table R403.1.2 are identical to the exceptions contained in the existing Section R403.1.2.Table R403.1.2 is consistent with the IRC with the only exception for the 1-story with plan dimension of greater than 50 feet in interior brace wall panels, in which the "IRC Commentary Figure R403.1.2" indicates continuous footings are required. However, under the same conditions, the IRC indicates continuous footings are not required for 2-story buildings if the exceptions listed in the existing Section R403.1.2 are met. It seems irrational that 2-story buildings (more mass in seismic loading) are not required to have continuous footings, while 1-story buildings (less mass in seismic loading) are required to have continuous footings under the same plan dimension and interior brace wall panel. Therefore, the proposed new Table R403.1.2 conservatively applies the same 2-story building requirements to 1-story buildings.

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 because the proposal is intended to present the current code requirements in a tabulated format for ease of understanding and implementation.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R403.1.2Continuous footing in Seismic Design Categories D_0, D_1 and D_2. Exterior walls and required interior *braced wall panels* of buildings located in *Seismic Design Categories* D_0, D_1 and D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice.

TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

BUILDING PLAN DIMENSIONS	1-STORY						2-STORY						3-STORY	
	50 feet or less			> 50 feet			50 feet or less			> 50 feet			Any	
SDC	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1
~~Exterior Brace Wall Panel~~														
Continuous Footings Supporting Exterior Walls	R	R	R	R	R	R	R	R	R	R	R	R	R	R
~~Interior Brace Wall Panel~~														
Continuous Footings Supporting Required Interior Braced Wall Panels	NR	NR	NR	R[a]	R[a]	R[a]	NR	NR	R[a]	R[a]	R[a]	R[a]	R	R

R = Continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4 required.
NR = Continuous footings not required.

a. NR when the following conditions are all met:
   1. The height of cripple walls does not exceed 4 feet (1219 mm).
   2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
   3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

Committee Reason: The committee concluded that the modification provides ease of use for the proposed change without any technical changes. The committee concluded that the proposal as modified provides the necessary clarifications and better organization of the continuous footing requirements in the seismic design category, D0, D1, and D2, to the code users. The proposal tabulates the provisions in a new Table R403.1.2 without changing the intent of the existing provisions (Vote: 10-0).

Public Comments

Public Comment 1

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org) requests As Modified by Public Comment

Further modify as follows:

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R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. Exterior walls and required interior *braced wall panels* of buildings located in *Seismic Design Categories* D_0, D_1 and D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice.

TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

BUILDING PLAN DIMENSIONS	1-STORY						2-STORY						3-STORY	
	50 feet or less			> 50 feet			50 feet or less			> 50 feet			Any	
SDC	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1
Continuous Footings Supporting Exterior Walls	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Continuous Footings Supporting Required Interior Braced Wall Panels	NR	NR	NR	R[a]	R[a]	R[a]	NR	NR	R[a]	R[a]	R[a]	R[a]	R	R

R = Continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4 required.
NR = Continuous footings not required.

a. ~~NR~~ Buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that ~~when~~ the following conditions are all met:
   1. The height of cripple walls does not exceed 4 feet (1219 mm).
   2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
   3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

Commenter's Reason: RB169-22 was approved by the IRC Committee as modified at the last hearing. However, it was realized after the hearing that Footnote (a) in Table R403.1.2 should have integrated the limitation of 50-foot intervals for braced wall panels for 2-story buildings, as specified in the Exception of the current Section R403.1.2. Note that while the Exception in the current Section R403.1.2 addresses 2-story buildings, it was explained in the Reasoning Statement of the original proposal that the same requirement could be conservatively applied to 1-story buildings. This was recognized by the IRC Committee and is covered in Footnote (a) of this public comment. This public comment corrects the oversight from the proposal based on the interpretation published in the IRC Commentary Figure R403.1.2.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This PC does not change the scope of the original proposal. This code change proposal will not increase or decrease the cost of construction because it is intended to clarify the existing code requirements.

Final Hearing Results

RB169-22 AMPC1

RB171-22

Original Proposal

IRC: R404.1.2, R404.1.2.1, TABLE R404.1.1(1), TABLE R404.1.1(2), TABLE R404.1.1(3), TABLE R404.1.1(4), R404.1.3.2, TABLE R404.1.2(1), TABLE R404.1.2(2), TABLE R404.1.2(3), TABLE R404.1.2(4), TABLE R404.1.2(5), TABLE R404.1.2(6), TABLE R404.1.2(7), TABLE R404.1.2(8), TABLE R404.1.2(9), R404.1.3.3.7.2, R404.1.3.3.7.6, R404.1.4.1, R404.1.4.2, R404.1.5.2

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

2021 International Residential Code

R404.1.2 Design of masonry foundation walls. Masonry foundation walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of TMS 402. Where TMS 402 or the provisions of this section are used to design masonry foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

Revise as follows:

R404.1.2.1 Masonry foundation walls. *Concrete masonry* and *clay masonry* foundation walls shall be constructed as set forth in Table ~~R404.1.1(1)~~ R404.1.2.1(1), ~~R404.1.1(2)~~R404.1.2.1(2), ~~R404.1.1(3)~~ R404.1.2.1(3) or ~~R404.1.1(4)~~ R404.1.2.1(4) and shall comply with applicable provisions of Section R606. In buildings assigned to *Seismic Design Categories* D_0, D_1 and D_2, *concrete masonry* and *clay masonry* foundation walls shall also comply with Section R404.1.4.1. Rubble stone masonry foundation walls shall be constructed in accordance with Sections R404.1.8 and R606.4.2. Rubble stone masonry walls shall not be used in *Seismic Design Categories* D_0, D_1 and D_2, or in *townhouses* in Seismic Design Category C.

TABLE ~~R404.1.1(1)~~ R404.1.2.1(1) PLAIN MASONRY FOUNDATION WALLS[f]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes[b]		
		GW, GP, SW and SP	GM, GC, SM, SM-SC and ML	SC, MH, ML-CL and inorganic CL
5	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
6	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
	6	8	10	12
7	4	6 solid[d] or 8	8	8
	5	6 solid[d] or 8	10	10
	6	10	12	10 solid[d]
	7	12	10 solid[d]	12 solid[d]
8	4	6 solid[d] or 8	6 solid[d] or 8	8
	5	6 solid[d] or 8	10	12
	6	10	12	12 solid[d]
	7	12	12 solid[d]	Note e
	8	10 grout[d]	12 grout[d]	Note e
9	4	6 grout[d] or 8 solid[d] or 12	6 grout[d] or 8 solid[d]	8 grout[d] or 10 solid[d]
	5	6 grout[d] or 10 solid[d]	8 grout[d] or 12 solid[d]	8 grout[d]
	6	8 grout[d] or 12 solid[d]	10 grout[d]	10 grout[d]
	7	10 grout[d]	10 grout[d]	12 grout
	8	10 grout[d]	12 grout	Note e
	9	12 grout	Note e	Note e

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.

b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

d. Solid indicates solid masonry unit; grout indicates grouted hollow units.

e. Wall construction shall be in accordance with Table ~~R404.1.1(2)~~ R404.1.2.1(2), ~~R404.1.1(3)~~R404.1.2.1(3) or ~~R404.1.1(4)~~R404.1.2.1(4), or a design shall be provided.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.1(2)~~ R404.1.2.1(2) 8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 5 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c] Soil classes and lateral soil load[d] (psf per foot below grade) GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet 8 inches	#4 at 48	#5 at 48	#6 at 48
7 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet 4 inches	#5 at 48	#6 at 48	#6 at 40
8 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#5 at 48	#6 at 48	#6 at 32
8 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet 8 inches	#6 at 48	#6 at 32	#6 at 24
9 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#6 at 48	#6 at 40	#6 at 24
	9 feet 4 inches	#6 at 40	#6 at 24	#6 at 16
10 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 32
	8 feet	#6 at 48	#6 at 32	#6 at 24
	9 feet	#6 at 40	#6 at 24	#6 at 16
	10 feet	#6 at 32	#6 at 16	#6 at 16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.1(3)~~R404.1.2.1(3) 10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 6.75 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c] Soil classes and later soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet 8 inches	#4 at 56	#5 at 56	#5 at 56
7 feet 4 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet 4 inches	#4 at 56	#5 at 56	#6 at 56
8 feet	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet	#5 at 56	#6 at 56	#6 at 48
8 feet 8 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet 8 inches	#5 at 56	#6 at 48	#6 at 32
9 feet 4 inches	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#5 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet	#5 at 56	#6 at 56	#6 at 40
	9 feet 4 inches	#6 at 56	#6 at 40	#6 at 24
10 feet	4 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	5 feet	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#5 at 56	#5 at 56
	7 feet	#5 at 56	#6 at 56	#6 at 48
	8 feet	#5 at 56	#6 at 48	#6 at 40
	9 feet	#6 at 56	#6 at 40	#6 at 24
	10 feet	#6 at 48	#6 at 32	#6 at 24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in *Seismic Design Categories* A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 6.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.1(4)~~R404.1.2.1(4) 12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 8.75 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[b, c] Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet 8 inches	#4 at 72	#4 at 72	#5 at 72
7 feet 4 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet 4 inches	#4 at 72	#5 at 72	#6 at 72
8 feet	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 64
8 feet 8 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet 8 inches	#5 at 72	#7 at 72	#6 at 48
9 feet 4 inches	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#5 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 56
	9 feet 4 inches	#6 at 72	#6 at 48	#6 at 40
10 feet	4 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	5 feet	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#5 at 72	#5 at 72
	7 feet	#4 at 72	#6 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 48
	9 feet	#6 at 72	#6 at 56	#6 at 40
	10 feet	#6 at 64	#6 at 40	#6 at 32

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance,*d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 8.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

R404.1.3.2 Reinforcement for foundation walls. Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table ~~R404.1.2(1)~~ R404.1.3.2(1). Vertical reinforcement shall be provided in accordance with Table ~~R404.1.2(2)~~R404.1.3.2 (2), ~~R404.1.2(3)~~R404.1.3.2 (3), ~~R404.1.2(4)~~ R404.1.3.2(4), ~~R404.1.2(5)~~ R404.1.3.2(5), ~~R404.1.2(6)~~ R404.1.3.2(6), ~~R404.1.2(7)~~ R404.1.3.2(7) or ~~R404.1.2(8)~~ R404.1.3.2(8). Vertical reinforcement for flat *basement* walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table ~~R404.1.2(9)~~ R404.1.3.2(9). For *basement* walls supporting above-grade concrete walls, vertical reinforcement shall be the greater of that required by Tables ~~R404.1.2(2)~~ R404.1.3.2(2) through ~~R404.1.2(8)~~ R404.1.3.2(8) or by Section R608.6 for the above-grade wall. In buildings assigned to Seismic Design Category D_0, D_1 or D_2, concrete foundation walls shall also comply with Section R404.1.4.2.

TABLE ~~R404.1.2(1)~~ R404.1.3.2(1) MINIMUM HORIZONTAL REINFORCEMENT FOR CONCRETE BASEMENT WALLS[a, b]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	LOCATION OF HORIZONTAL REINFORCEMENT
≤ 8	One No. 4 bar within 12 inches of the top of the wall story and one No. 4 bar near mid-height of the wall story.
> 8	One No. 4 bar within 12 inches of the top of the wall story and one No. 4 bar near third points in the wall story.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa.

a. Horizontal reinforcement requirements are for reinforcing bars with a minimum yield strength of 40,000 psi and concrete with a minimum concrete compressive strength of 2,500 psi.

b. See Section R404.1.3.2 for minimum reinforcement required for foundation walls supporting above-grade concrete walls.

TABLE ~~R404.1.2(2)~~ R404.1.3.2(2) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, g, h, i, j, k]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[f] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	6 @ 39	6 @ 48
	6	5 @ 39	6 @ 48	6 @ 35
	7	6 @ 48	6 @ 34	6 @ 25
	8	6 @ 39	6 @ 25	6 @ 18
9	4	NR	NR	NR
	5	NR	5 @ 37	6 @ 48
	6	5 @ 36	6 @ 44	6 @ 32
	7	6 @ 47	6 @ 30	6 @ 22
	8	6 @ 34	6 @ 22	6 @ 16
	9	6 @ 27	6 @ 17	DR
10	4	NR	NR	NR
	5	NR	5 @ 35	6 @ 48
	6	6 @ 48	6 @ 41	6 @ 30
	7	6 @ 43	6 @ 28	6 @ 20
	8	6 @ 31	6 @ 20	DR
	9	6 @ 24	6 @ 15	DR
	10	6 @ 19	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. NR indicates vertical wall reinforcement is not required, except for 6-inch-nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(3)~~ R404.1.3.2(3) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH (203 mm) NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches) Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 37
	7	NR	6 @ 36	6 @ 35
	8	6 @ 41	6 @ 35	6 @ 26
9	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 35
	7	NR	6 @ 35	6 @ 32
	8	6 @ 36	6 @ 32	6 @ 23
	9	6 @ 35	6 @ 25	6 @ 18
10	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 35
	7	NR	6 @ 35	6 @ 29
	8	6 @ 35	6 @ 29	6 @ 21
	9	6 @ 34	6 @ 22	6 @ 16
	10	6 @ 27	6 @ 17	6 @ 13

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(4)~~ R404.1.3.2(4) MINIMUM VERTICAL REINFORCEMENT FOR 10-INCH NOMINAL FLAT CONCRETE BASEMENT WALLS[b, c, d, e, f, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches) Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	NR
	8	6 @ 48	6 @ 35	6 @ 28
9	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	6 @ 31
	8	NR	6 @ 31	6 @ 28
	9	6 @ 37	6 @ 28	6 @ 24
10	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	6 @ 28
	8	NR	6 @ 28	6 @ 28
	9	6 @ 33	6 @ 28	6 @ 21
	10	6 @ 28	6 @ 23	6 @ 17

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(5)~~ R404.1.3.2(5) MINIMUM VERTICAL WALL REINFORCEMENT FOR 6-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[f] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches) Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	4 @ 48	4 @ 46	6 @ 39
	5	4 @ 45	5 @ 46	6 @ 47
	6	5 @ 45	6 @ 40	DR
	7	6 @ 44	DR	DR

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
	8	6 @ 32	DR	DR
9	4	4 @ 48	4 @ 46	4 @ 37
	5	4 @ 42	5 @ 43	6 @ 44
	6	5 @ 41	6 @ 37	DR
	7	6 @ 39	DR	DR
	> 8	DR[i]	DR	DR
10	4	4 @ 48	4 @ 46	4 @ 35
	5	4 @ 40	5 @ 40	6 @ 41
	6	5 @ 38	6 @ 34	DR
	7	6 @ 36	DR	DR
	> 8	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(6)~~ R404.1.3.2(6) MINIMUM VERTICAL REINFORCEMENT FOR 8-INCH WAFFLE-GRID BASEMENT WALLS[b, c, d, e, f, h, i, j, k]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	NR	NR	NR
	5	NR	5 @ 48	5 @ 46
	6	5 @ 48	5 @ 43	6 @ 45
	7	5 @ 46	6 @ 43	6 @ 31
	8	6 @ 48	6 @ 32	6 @ 23
9	4	NR	NR	NR
	5	NR	5 @ 47	5 @ 46
	6	5 @ 46	5 @ 39	6 @ 41
	7	5 @ 42	6 @ 38	6 @ 28
	8	6 @ 44	6 @ 28	6 @ 20
	9	6 @ 34	6 @ 21	DR
10	4	NR	NR	NR

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
	5	NR	5 @ 46	5 @ 44
	6	5 @ 46	5 @ 37	6 @ 38
	7	5 @ 38	6 @ 35	6 @ 25
	8	6 @ 39	6 @ 25	DR
	9	6 @ 30	DR	DR
	10	6 @ 24	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 (420 MPa) and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~ R404.1.3.2(9).

d. NR indicates vertical reinforcement is not required.

e. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

f. Interpolation shall not be permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. See Section R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

i. See Table R608.3 for thicknesses and dimensions of waffle-grid walls.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(7)~~ R404.1.3.2(7) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH (152 mm) SCREEN-GRID BASEMENT WALLS[b, c, d, e, g, h, i, j]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[f] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)		
		Soil classes[a] and design lateral soil (psf per foot of depth)		
		GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
8	4	4 @ 48	4 @ 48	5 @ 43
	5	4 @ 48	5 @ 48	5 @ 37
	6	5 @ 48	6 @ 45	6 @ 32
	7	6 @ 48	DR	DR
	8	6 @ 36	DR	DR
9	4	4 @ 48	4 @ 48	4 @ 41
	5	4 @ 48	5 @ 48	6 @ 48
	6	5 @ 45	6 @ 41	DR
	7	6 @ 43	DR	DR
	> 8	DR	DR	DR
10	4	4 @ 48	4 @ 48	4 @ 39
	5	4 @ 44	5 @ 44	6 @ 46
	6	5 @ 42	6 @ 38	DR

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches) Soil classes and design lateral soil (psf per foot of depth) GW, GP, SW, SP 30	GM, GC, SM, SM-SC and ML 45	SC, ML-CL and inorganic CL 60
	7	6 @ 40	DR	DR
	> 8	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi, concrete with a minimum specified compressive strength of 2,500 psi and vertical reinforcement being located at the centerline of the wall. See Section R404.1.3.3.7.2.

c. Maximum spacings shown are the values calculated for the specified bar size. Where the bar used is Grade 60 and the size specified in the table, the actual spacing in the wall shall not exceed a whole-number multiple of 12 inches (12, 24, 36 and 48) that is less than or equal to the tabulated spacing. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~R404.1.3.2(9).

d. Deflection criterion is *L*/240, where *L* is the height of the basement wall in inches.

e. Interpolation is not permitted.

f. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

g. See Sections R404.1.3.2 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

h. See Table R608.3 for thicknesses and dimensions of screen-grid walls.

i. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

j. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(8)~~ R404.1.3.2(8) MINIMUM VERTICAL REINFORCEMENT FOR 6-, 8-, 10- AND 12-INCH NOMINAL FLAT BASEMENT WALLS[b, c, d, e, f, h, i, k, n, o]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[g] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches) Soil classes[a] and design lateral soil (psf per foot of depth)											
		GW, GP, SW, SP 30				GM, GC, SM, SM-SC and ML 45				SC, ML-CL and inorganic CL 60			
		Minimum nominal wall thickness (inches)											
		6	8	10	12	6	8	10	12	6	8	10	12
5	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
6	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	NR	NR[l]	NR	NR	4 @ 35	NR[l]	NR	NR
	6	NR	NR	NR	NR	5 @ 48	NR	NR	NR	5 @ 36	NR	NR	NR
7	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	NR	NR	NR	NR	5 @ 47	NR	NR	NR
	6	NR	NR	NR	NR	5 @ 42	NR	NR	NR	6 @ 43	5 @ 48	NR[l]	NR
	7	5 @ 46	NR	NR	NR	6 @ 42	5 @ 46	NR[l]	NR	6 @ 34	6 @ 48	NR	NR
8	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	4 @ 38	NR[l]	NR	NR	5 @ 43	NR	NR	NR
	6	4 @ 37	NR[l]	NR	NR	5 @ 37	NR	NR	NR	6 @ 37	5 @ 43	NR[l]	NR
	7	5 @ 40	NR	NR	NR	6 @ 37	5 @ 41	NR[l]	NR	6 @ 34	6 @ 43	NR	NR
	8	6 @ 43	5 @ 47	NR[l]	NR	6 @ 34	6 @ 43	NR	NR	6 @ 27	6 @ 32	6 @ 44	NR
9	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	4 @ 35	NR[l]	NR	NR	5 @ 40	NR	NR	NR
	6	4 @ 34	NR[l]	NR	NR	6 @ 48	NR	NR	NR	6 @ 36	6 @ 39	NR[l]	NR
	7	5 @ 36	NR	NR	NR	6 @ 34	5 @ 37	NR	NR	6 @ 33	6 @ 38	5 @ 37	NR[l]
	8	6 @ 38	5 @ 41	NR[l]	NR	6 @ 33	6 @ 38	5 @ 37	NR[l]	6 @ 24	6 @ 29	6 @ 39	4 @ 48[m]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)											
		Soil classes and design lateral soil (psf per foot of depth)											
		GW, GP, SW, SP 30				GM, GC, SM, SM-SC and ML 45				SC, ML-CL and inorganic CL 60			
		Minimum nominal wall thickness (inches)											
		6	8	10	12	6	8	10	12	6	8	10	12
	9	6 @ 34	6 @ 46	NR	NR	6 @ 26	6 @ 30	6 @ 41	NR	6 @ 19	6 @ 23	6 @ 30	6 @ 39
10	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	4 @ 33	NR[l]	NR	NR	5 @ 38	NR	NR	NR
	6	5 @ 48	NR[l]	NR	NR	6 @ 45	NR	NR	NR	6 @ 34	5 @ 37	NR	NR
	7	6 @ 47	NR	NR	NR	6 @ 34	6 @ 48	NR	NR	6 @ 30	6 @ 35	6 @ 48	NR[l]
	8	6 @ 34	5 @ 38	NR	NR	6 @ 30	6 @ 34	6 @ 47	NR[l]	6 @ 22	6 @ 26	6 @ 35	6 @ 45[m]
	9	6 @ 34	6 @ 41	4 @ 48	NR[l]	6 @ 23	6 @ 27	6 @ 35	4 @ 48[m]	DR	6 @ 22	6 @ 27	6 @ 34
	10	6 @ 28	6 @ 33	6 @ 45	NR	DR[j]	6 @ 23	6 @ 29	6 @ 38	DR	6 @ 22	6 @ 22	6 @ 28

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.1571 kPa^2/m, 1 pound per square inch = 6.895 kPa.

NR = Not Required.

DR = Design Required.

a. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

b. Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi.

c. Vertical reinforcement with a yield strength of less than 60,000 psi and bars of a different size than specified in the table are permitted in accordance with Section R404.1.3.3.7.6 and Table ~~R404.1.2(9)~~R404.1.3.2(9).

d. NR indicates vertical wall reinforcement is not required, except for 6-inch nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches on center.

e. Allowable deflection criterion is $L/240$, where L is the unsupported height of the basement wall in inches.

f. Interpolation is not permitted.

g. Where walls will retain 4 feet or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

h. Vertical reinforcement shall be located to provide a cover of $1^1/_4$ inches measured from the inside face of the wall. The center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness or $^3/_8$ inch.

i. Concrete cover for reinforcement measured from the inside face of the wall shall be not less than $^3/_4$ inch. Concrete cover for reinforcement measured from the outside face of the wall shall be not less than $1^1/_2$ inches for No. 5 bars and smaller, and not less than 2 inches for larger bars.

j. DR means design is required in accordance with the applicable building code, or in the absence of a code, in accordance with ACI 318.

k. Concrete shall have a specified compressive strength, f'_c, of not less than 2,500 psi at 28 days, unless a higher strength is required by Note l or m.

l. The minimum thickness is permitted to be reduced 2 inches, provided that the minimum specified compressive strength of concrete, f'_c, is 4,000 psi.

m. A plain concrete wall with a minimum nominal thickness of 12 inches is permitted, provided that the minimum specified compressive strength of concrete, f'_c, is 3,500 psi.

n. See Table R608.3 for tolerance from nominal thickness permitted for flat walls.

o. The use of this table shall be prohibited for soil classifications not shown.

TABLE ~~R404.1.2(9)~~ R404.1.3.2(9) MINIMUM SPACING FOR ALTERNATE BAR SIZE AND ALTERNATE GRADE OF STEEL[a, b, c]

BAR SPACING FROM APPLICABLE TABLE IN SECTION R404.1.3.2 (inches)	BAR SIZE FROM APPLICABLE TABLE IN SECTION R404.1.3.2														
	#4					#5					#6				
	Alternate bar size and alternate grade of steel desired														
	Grade 60		Grade 40			Grade 60		Grade 40			Grade 60		Grade 40		
	#5	#6	#4	#5	#6	#4	#6	#4	#5	#6	#4	#5	#4	#5	#6
	Maximum spacing for alternate bar size and alternate grade of steel (inches)														
8	12	18	5	8	12	5	11	3	5	8	4	6	2	4	5
9	14	20	6	9	13	6	13	4	6	9	4	6	3	4	6
10	16	22	7	10	15	6	14	4	7	9	5	7	3	5	7
11	17	24	7	11	16	7	16	5	7	10	5	8	3	5	7
12	19	26	8	12	18	8	17	5	8	11	5	8	4	6	8
13	20	29	9	13	19	8	18	6	9	12	6	9	4	6	9
14	22	31	9	14	21	9	20	6	9	13	6	10	4	7	9
15	23	33	10	16	22	10	21	6	10	14	7	11	5	7	10
16	25	35	11	17	23	10	23	7	11	15	7	11	5	8	11
17	26	37	11	18	25	11	24	7	11	16	8	12	5	8	11
18	28	40	12	19	26	12	26	8	12	17	8	13	5	8	12
19	29	42	13	20	28	12	27	8	13	18	9	13	6	9	13
20	31	44	13	21	29	13	28	9	13	19	9	14	6	9	13
21	33	46	14	22	31	14	30	9	14	20	10	15	6	10	14
22	34	48	15	23	32	14	31	9	15	21	10	16	7	10	15
23	36	48	15	24	34	15	33	10	15	22	10	16	7	11	15
24	37	48	16	25	35	15	34	10	16	23	11	17	7	11	16
25	39	48	17	26	37	16	35	11	17	24	11	18	8	12	17
26	40	48	17	27	38	17	37	11	17	25	12	18	8	12	17
27	42	48	18	28	40	17	38	12	18	26	12	19	8	13	18
28	43	48	19	29	41	18	40	12	19	26	13	20	8	13	19
29	45	48	19	30	43	19	41	12	19	27	13	20	9	14	19
30	47	48	20	31	44	19	43	13	20	28	14	21	9	14	20
31	48	48	21	32	45	20	44	13	21	29	14	22	9	15	21
32	48	48	21	33	47	21	45	14	21	30	15	23	10	15	21
33	48	48	22	34	48	21	47	14	22	31	15	23	10	16	22
34	48	48	23	35	48	22	48	15	23	32	15	24	10	16	23
35	48	48	23	36	48	23	48	15	23	33	16	25	11	16	23
36	48	48	24	37	48	23	48	15	24	34	16	25	11	17	24
37	48	48	25	38	48	24	48	16	25	35	17	26	11	17	25
38	48	48	25	39	48	25	48	16	25	36	17	27	12	18	25
39	48	48	26	40	48	25	48	17	26	37	18	27	12	18	26
40	48	48	27	41	48	26	48	17	27	38	18	28	12	19	27
41	48	48	27	42	48	26	48	18	27	39	19	29	12	19	27
42	48	48	28	43	48	27	48	18	28	40	19	30	13	20	28
43	48	48	29	44	48	28	48	18	29	41	20	30	13	20	29
44	48	48	29	45	48	28	48	19	29	42	20	31	13	21	29
45	48	48	30	47	48	29	48	19	30	43	20	32	14	21	30
46	48	48	31	48	48	30	48	20	31	44	21	32	14	22	31
47	48	48	31	48	48	30	48	20	31	44	21	33	14	22	31
48	48	48	32	48	48	31	48	21	32	45	22	34	15	23	32

For SI: 1 inch = 25.4 mm.

a. This table is for use with tables in Section R404.1.3.2 that specify the minimum bar size and maximum spacing of vertical wall reinforcement for foundation walls and above-grade walls. Reinforcement specified in tables in Section R404.1.3.2 is based on Grade 60 steel reinforcement.

b. Bar spacing shall not exceed 48 inches on center and shall be not less than one-half the nominal wall thickness.

c. For Grade 50 steel bars (ASTM A996, Type R), use spacing for Grade 40 bars or interpolate between Grades 40 and 60.

R404.1.3.3.7.2 Location of reinforcement in wall. The center of vertical reinforcement in *basement* walls determined from Tables ~~R404.1.2(2)~~ R404.1.3.2(2) through ~~R404.1.2(7)~~ R404.1.3.2(7) shall be located at the centerline of the wall. Vertical reinforcement in *basement* walls determined from Table ~~R404.1.2(8)~~ R404.1.3.2(8) shall be located to provide a maximum cover of $1^{1}/_{4}$ inches (32 mm) measured from the inside face of the wall. Regardless of the table used to determine vertical wall reinforcement, the center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness and $^{3}/_{8}$ inch (10 mm). Horizontal and vertical reinforcement shall be located in foundation walls to provide the minimum cover required by Section R404.1.3.3.7.4.

R404.1.3.3.7.6 Alternate grade of reinforcement and spacing. Where tables in Section R404.1.3.2 specify vertical wall reinforcement based on minimum bar size and maximum spacing, which are based on Grade 60 (414 MPa) steel reinforcement, different size bars or bars made from a different grade of steel are permitted provided that an equivalent area of steel per linear foot of wall is provided. Use of Table ~~R404.1.2(9)~~ R404.1.3.2(9) is permitted to determine the maximum bar spacing for different bar sizes than specified in the tables or bars made from a different grade of steel. Bars shall not be spaced less than one-half the wall thickness, or more than 48 inches (1219 mm) on center.

R404.1.4.1 Masonry foundation walls. In buildings assigned to Seismic Design Category D_0, D_1 or D_2, as established in Table R301.2, masonry foundation walls shall comply with this section. In addition to the requirements of Table ~~R404.1.1(1)~~ R404.1.2.1(1), plain masonry foundation walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
4. Masonry stem walls shall have a minimum vertical reinforcement of one No. 4 (No. 13) bar located not greater than 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table ~~R404.1.1(2)~~ R404.1.2.1(2), ~~R404.1.1(3)~~ R404.1.2.1(3) or ~~R404.1.1(4)~~ R404.1.2.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

R404.1.4.2 Concrete foundation walls. In buildings assigned to Seismic Design Category D_0, D_1 or D_2, as established in Table R301.2, concrete foundation walls that support light-frame walls shall comply with this section, and concrete foundation walls that support above-grade concrete walls shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.3). In addition to the horizontal reinforcement required by Table ~~R404.1.2(1)~~ R404.1.3.2(1), plain concrete walls supporting light-frame walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted where the maximum wall height is 4 feet, 6 inches (1372 mm).

Foundation walls less than 7.5 inches (191 mm) in thickness, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be provided with horizontal reinforcement in accordance with Table ~~R404.1.2(1)~~ R404.1.3.2(1), and vertical reinforcement in accordance with Table ~~R404.1.2(2)~~ R404.1.3.2(2), ~~R404.1.2(3)~~ R404.1.3.2(3), ~~R404.1.2(4)~~ R404.1.3.2(4), ~~R404.1.2(5)~~ R404.1.3.2(5), ~~R404.1.2(6)~~ R404.1.3.2(6), ~~R404.1.2(7)~~ R404.1.3.2(7) or ~~R404.1.2(8)~~ R404.1.3.2(8). Where Tables ~~R404.1.2(2)~~ R404.1.3.2(2) through ~~R404.1.2(8)~~ R404.1.3.2(8) permit plain concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided.

R404.1.5.2 Concrete wall thickness. The thickness of concrete foundation walls shall be equal to or greater than the thickness of the wall in the story above. Concrete foundation walls with corbels, brackets or other projections built into the wall for support of masonry veneer or other purposes are not within the scope of the tables in this section.Where a concrete foundation wall is reduced in thickness to provide a shelf for the support of masonry veneer, the reduced thickness shall be equal to or greater than the thickness of the wall in the story above. Vertical reinforcement for the foundation wall shall be based on Table ~~R404.1.2(8)~~ R404.1.3.2(8) and located in the wall as required by Section R404.1.3.3.7.2 where that table is used. Vertical reinforcement shall be based on the thickness of the thinner portion of the wall.

> **Exception:** Where the height of the reduced thickness portion measured to the underside of the floor assembly or sill plate above is less than or equal to 24 inches (610 mm) and the reduction in thickness does not exceed 4 inches (102 mm), the vertical reinforcement is permitted to be based on the thicker portion of the wall.

Reason: This proposal fixes the masonry and concrete tables issue in IRC 2021. Currently, the masonry tables are listed under R404.1.1 Design required for general concrete and masonry accepted engineering practice, which is inaccurate. The concrete tables are listed under R404.1.2 Design of masonry foundation walls which is not accurate. This proposal relocates the tables to the correct technical sections they belong to. All Masonry tables moved to section R404.1.2.1 Masonry foundation walls, and all concrete tables moved to section R404.1.3.2 Reinforcement for foundation walls.
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 proponent is proposing the relocation of the tables. The tables are relocated under the first related subsections mentioned in the code. The proposal does not make any technical changes in the tables that could affect construction costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the current code misplaces the wall tables, making it confusing to the users and could cause problems with correlating the related information in the associated sections. Therefore, the committee determined that the proposal corrects the location of the masonry and concrete wall tables (Vote:10-0).

Final Hearing Results

RB171-22	AS

RB172-22

Original Proposal

IRC: R502.3.3, TABLE R502.3.3(1), TABLE R502.3.3(2)

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R502.3.3 Floor cantilevers. Floor cantilever spans shall not exceed the nominal depth of the wood floor joist. Floor cantilevers constructed in accordance with Table R502.3.3(1) shall be permitted where supporting a light-frame bearing wall and roof only. Floor cantilevers constructed in accordance with Table R502.3.3(2) shall be permitted where supporting an exterior balcony ~~are permitted to be constructed in accordance with Table R502.3.3(2)~~. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the support for the cantilever. Where the cantilever length is 24 inches (610 mm) or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.

TABLE R502.3.3(1) CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY[a, b, c, f, g, ~~h~~] (Floor live load ≤ 40 psf, roof live load ≤ 20 psf)

MEMBER & SPACING	MAXIMUM CANTILEVER SPAN (uplift force at backspan support in lb)[d, e]											
	Ground Snow Load											
	≤ 20 psf			30 psf			50 psf			70 psf		
	Roof Width			Roof Width			Roof Width			Roof Width		
	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft
2 × 8 @ 12″	20″ (177)	15″ (227)	—	18″ (209)	—	—	—	—	—	—	—	—
2 × 10 @ 16″	29″ (228)	21″ (297)	16″ (364)	26″ (271)	18″ (354)	—	20″ (375)	—	—	—	—	—
2 × 10 @ 12″	36″ (166)	26″ (219)	20″ (270)	34″ (198)	22″ (263)	16″ (324)	26″ (277)	—	—	19″ (356)	—	—
2 × 12 @ 16″	—	32″ (287)	25″ (356)	36″ (263)	29″ (345)	21″ (428)	29″ (367)	20″ (484)	—	23″ (471)	—	—
2 × 12 @ 12″	—	42″ (209)	31″ (263)	—	37″ (253)	27″ (317)	36″ (271)	27″ (358)	17″ (447)	31″ (348)	19″ (462)	—
2 × 12 @ 8″	—	48″ (136)	45″ (169)	—	48″ (164)	38″ (206)	—	40″ (233)	26″ (294)	36″ (230)	29″ (304)	18″ (379)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.

b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, Southern pine, hem-fir and spruce-pine-fir for repetitive (three or more) members.

c. Ratio of backspan to cantilever span shall be not less than 3:1.

d. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.

e. Uplift force is for a backspan to cantilever span ratio of 3:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 3 divided by the actual backspan ratio provided (3/backspan ratio).

f. See Section R301.2.2.6, Item 1, for additional limitations on cantilevered floor joists for detached one- and two-family dwellings in Seismic Design Category D_0, D_1 or D_2 and townhouses in Seismic Design Category C, D_0, D_1 or D_2.

g. ~~A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.~~

~~h~~g. Linear interpolation shall be permitted for building widths and ground snow loads other than shown.

TABLE R502.3.3(2) CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY[a, b, e, ~~f~~]

MEMBER SIZE	SPACING	MAXIMUM CANTILEVER SPAN (uplift force at backspan support in lb)[c, d]		
		Ground Snow Load		
		≤ 30 psf	50 psf	70 psf
2 × 8	12″	42″ (139)	39″ (156)	34″ (165)
2 × 8	16″	36″ (151)	34″ (171)	29″ (180)
2 × 10	12″	61″ (164)	57″ (189)	49″ (201)
2 × 10	16″	53″ (180)	49″ (208)	42″ (220)
2 × 10	24″	43″ (212)	40″ (241)	34″ (255)
2 × 12	16″	72″ (228)	67″ (260)	57″ (268)
2 × 12	24″	58″ (279)	54″ (319)	47″ (330)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are based on No. 2 Grade lumber of Douglas fir-larch, Southern pine, hem-fir, and spruce-pine-fir for repetitive (three or more) members.

b. Ratio of backspan to cantilever span shall be not less than 2:1.

c. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.

d. Uplift force is for a backspan to cantilever span ratio of 2:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 2 divided by the actual backspan ratio provided (2/backspan ratio).

e. ~~A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.~~

~~f~~e. Linear interpolation shall be permitted for ground snow loads other than shown.

Reason: This code change is meant to do three things: move a construction-related requirement from a table footnote to the appropriate text section, clarify the location of the required blocking, and make the sentence structures parallel in the two cantilever cases. The intent is for this to be editorial, with no change to actual requirements.
Footnote g in Table R502.3.3(1) and Footnote e in Table R502.3.3(2) are both identical and state "A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required." This is a construction requirement that is not related to the use of the table, so it is more appropriately placed in the charging text section. The second sentence is a bit unclear, in that it states that the blocking must be provided "at the supported end". Actually both ends of the joist are the supported end. So it is proposed to take the wording from the next sentence and state that the blocking must be provided "at the support for the cantilever". The requirements of R502.7 will apply to the supported end at the interior of the building.

Finally, the language of R502.3.3 is slightly revised so that each sentence has the same structure and meaning.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no intent to change the requirements. So there should be no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal reduces any risk by clarifying blocking requirements. The clarification has been done by moving the construction-related requirement from both tables' footnotes to the appropriate text section since the footnote text is not related to the use of the tables. In addition, the proposal clarifies the second sentence by replacing "at the supported end" by "at the support for the cantilever." (Vote: 9-0).

Final Hearing Results

RB172-22 AS

RB173-22

Original Proposal

IRC: R502.11 (New), R502.11.1 (New), 502.11.2 (New), 502.11.3 (New)

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

2021 International Residential Code

Add new text as follows:

R502.11 Floor framing supporting guards. The framing at the open edge of a floor supporting a required guard assembly not exceeding 44 inches (1118 mm) in height shall be constructed in accordance with Sections R502.11.1 or R502.11.2 or shall be designed in accordance with accepted engineering practice to support the guard assembly. Trusses and I-joists are prohibited as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member.

R502.11.1 Conventional edge framing. The framing at the edge of the floor shall consist of a solid or built-up wood member having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 with a roll brace aligned with each guard post.

502.11.2 Timber edge framing. The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 at intervals of 48 inches (1219 mm) or less.

502.11.3 Roll bracing. Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

Reason: The Problem:

Guards are required to transfer the outward and downward loads applied at the top of the guard to the structure. If the structure fails, the guard cannot perform its defined function to minimize the possibility of a fall. Many floor systems (both conventional and engineered) are not being designed and constructed to resist guard loads at the edge of walking surfaces where guards are required. Manufacturers and designers of engineered floor systems (e.g., trusses and I-joists) and plan reviewers are commonly unaware of guard attachment requirements and do not ensure that framing is adequate to support guards. Inadequate framing is commonly encountered with costly reinforcement (and possibly redesign) needed at the time of guard installation.

In current practice where inadequate framing is encountered, flooring or ceilings are ripped out to install blocking to harden the edge beam for attachment of the guard. Such fixes are not engineered and, in many cases, occur after the rough inspection. The problem will persist unless a solution can be codified.

A Collaborative Formed:

The SMA surveyed our membership and found the problem to be chronic across the nation and assembled a task group representing manufacturers of, trusses, I- joists, framing and post connection hardware, and guard components as well as, home builders, guard fabricators, guard installers, stairbuilders, and others from industry at large, some 18 participants in all. About half of the team are engineers, and about half have extensive involvement in code and standard development. Meeting biweekly since early fall of 2021 this team has worked together to develop consensus upon an engineered solution presented here with two prescriptive options suitable for inclusion in the 2024 IRC.

A Prescriptive Solution:

By recommendation of the manufacturers of I-joists and trusses and consensus of the entire task group this proposal prohibits the use of I-joists and trusses *as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member.* This is based upon the limited embedment of fasteners in the thickness of the joist and truss materials, open areas/voids, and surfaces where fasteners cannot be used that would weaken the component or connections between the truss/I-joist components.

Both top mount and side mount guards are suitable provided there is sufficient material to engage threaded fasteners and the edge beam/joist is not subject to rotation or torsion. Based upon calculation of the loads transferred to the structure from the top of the guard, two options are provided. (Calculations may be reviewed at the link below.)

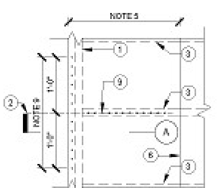
R502.11.1 Conventional edge framing, describes the minimal thickness to resist withdrawal of fasteners and height of the edge beam/joist as that of a common double 2 x 10. Blocking/roll bracing is aligned with the post locations to resist rotation and eliminate torsion induced by guard loads.

R502.11.2 Timber edge framing, provides specifications to allow use of a thicker timber or glulam which is sized to resist torsion allowing roll bracing to be spaced at a maximum distance of 48 inches on center to alleviate the need for precise alignment of the post with the roll bracing or a joist.

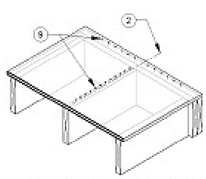
Although the minimum guard height in the IRC is 36 inches it is not unusual that portions of the guard, post caps, or finials extend above the guard height. We agreed that a height of 44 inches would be reasonably conservative to use for the purpose of calculating the edge beam size and roll bracing requirements. To restrict outward movement of the top of the edge beam, specific nailing of the floor sheathing is called out at the location of roll bracing. Floor sheathing must be continuous for a minimum distance from the open edge to assure the structural integrity of the bracing and edge beam. The nailing requirements for attachment of the blocking used as roll bracing to the joists prevents uplift of the blocking, and the minimum length allows it to fit into one joist bay where joist spacing is taken from the open edge of the edge beam. These details are specified in **R502.11.3 Roll Bracing.**

This proposal has been clearly and carefully constructed to be understood and enforced without figures referenced in the code text. We have included drawings to aid understanding among the many proposals to be considered in this cycle. The drawings submitted would however be suitable for inclusion in the commentary.

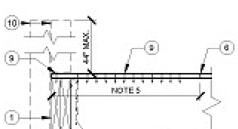
Engineering Calculations supporting this proposal can be found at this link:https://stairways.org/guard-calculations/



TOP VIEW JOISTS PERPENDICULAR TO EDGE GUARD POST ALIGNED WITH JOIST

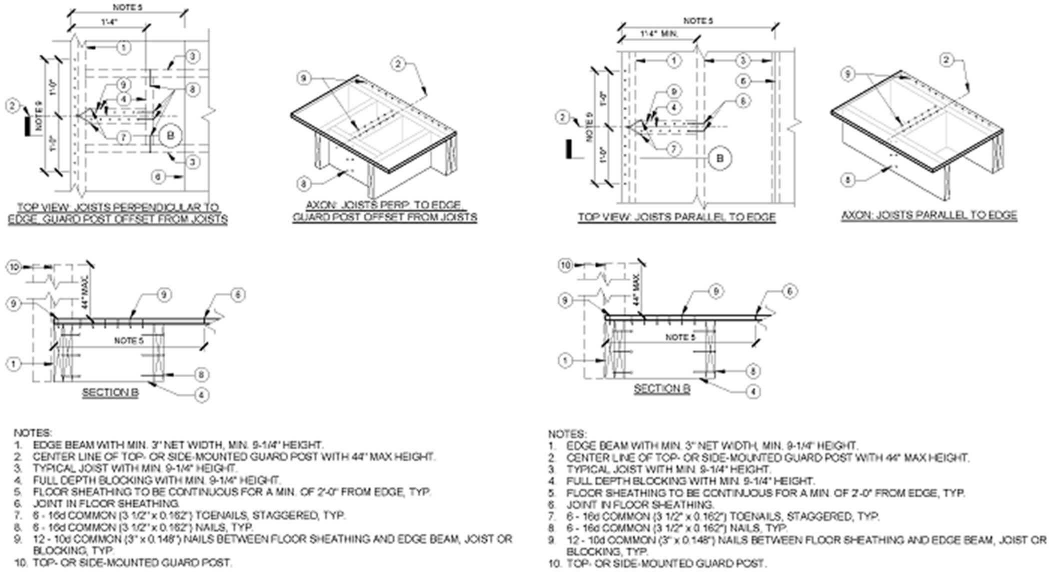


AXON JOISTS PERP TO EDGE GUARD POST ALIGNED WITH JOIST



SECTION A

NOTES:
1. EDGE BEAM WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.



Cost Impact: The code change proposal will decrease the cost of construction

This proposal will decrease the cost of construction due to the elimination of necessary after-the-fact demolition and repair to install blocking at each post location. An average job with guards has three or more posts with 1 to 2 hours each for blocking plus repairs to finish surfaces estimated at approximately $400 - $800 in extra charges per 3 post job. This does not include any engineering fees if applicable.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal provides a prescriptive solution to correct the requirements of guards transferring the outward and downward loads applied at the top of the guard to the structure and the effect of the structure failing on the guard. The committee encourages the proponent to look into adding clarifying diagrams and adding engineering products to the conventional edge framing during the public comment phase (Vote: 5-4).

Public Comments

Public Comment 1

Proponents: David Cooper, Stair Design and Manufacturing Consultants, Stairbuilders and Manufacturers Association (coderep@stairways.org); Erik Farrington, Simpson Gumpertz & Heger, myself (ewfarrington@sgh.com); Renda Barr, SRG Stairs, LLC, Purchasing Manager, Stairbuilders and Manufacturers Association (rbarr@srg-ventures.com); Robert Aulicky, Self, Stairbuilders & Manufacturers Association (acitizen@reagan.com); Marvin Strzyzewski, P.E., Truss Engineering Company, Truss Engineering Company (marvins@mii.com); Thomas Zuzik Jr, NOMMA (coderep@railingcodes.com); Daniel Obrien, Universal Building Systems, Inc, Universal Building Systems, Inc. (dano@stairfasteners.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R502.11 Floor framing supporting guards. The framing at the open edge of a floor supporting a required guard assembly~~not exceeding 44 inches (1118 mm) in height~~ shall be constructed in accordance with Sections R502.11.1 or R502.11.2for guard assemblies not exceeding 44 inches (1118mm) in height or shall be designed in accordance with accepted engineering practice to support the guard assembly. Where ~~T~~ trusses and I-joists areused ~~prohibited~~ as edge framing members supporting guards, ~~except where~~ the effects of the guard loads shall be ~~are~~ specifically considered in the design of the edge member.

R502.11.1 Conventional edge framing. Where a roll brace is aligned with each guard post, the~~The~~ framing at the edge of the floor shall consist of a solid or built-up ~~wood~~ member of lumber, structural glued laminated timber, or structural composite lumberhaving a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~with a roll brace aligned with each guard pos~~t.

R502.11.2 Timber edge framing. Where a roll brace is not aligned with each guard post, the ~~The~~ framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) structural glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 at intervals of 48 inches (1219 mm) or less.

R502.11.3 Roll bracing. Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

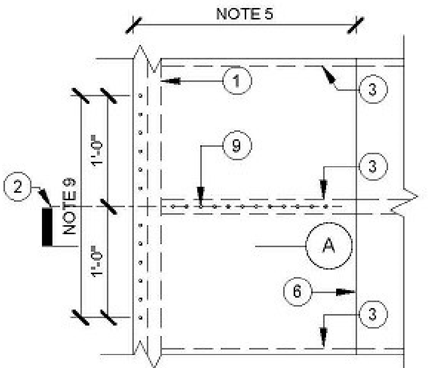
Commenter's Reason: The Committee approved this proposal because it provides a prescriptive solution for floor framing supporting guards that will resist required design loads applied to the top of the guard and ***corrects a serious deficit*** in the current requirements for floor framing ***that void the warranties of engineered floor systems and allows the potential failure of the floor and connected guard assembly/system.*** However the Committee specifically requested clarification by public comment. The changes included in this modification are described below. They address not only the Committee's request but also those issues raised in testimony, further collaboration of industry and editorial changes to aid in understanding.

1. Moving the text *"not exceeding 44 inches (1118 mm) in height"* and adding the words *"for guard assemblies"* to the moved phrase eliminates a possible interpretation that R502.11 would not allow engineered design for guards in excess of 44 inches in height, which is certainly not the intent.
2. Subsequent to the CAH, with recent input from truss and I-joist manufacturers participating in the task group, the inference of conditional prohibition was rephrased to more clearly state that *"Where trusses and I-joists are used as edge framing members supporting guards the guard loads shall be specifically considered in the design of the edge member."*
3. Questions from the committee and testimony inquired as to the difference between the application of R502.11.1 and R502.11.2. The purposeful application of each section has been clarified by moving the text related to the *alignment of roll bracing with the guard posts* to the beginning of both sections to clearly establish and differentiate the dependent condition for use of each section.
4. Some of the Committee members questioned that it was not clear that R502.11.1 does not preclude the use of Structural Composite Lumber. To clarify this the phrase *"...member of lumber, structural glued laminated timber, or structural composite lumber"* has been substituted for *"wood"* to specifically include these options. Structural composite lumber would include: LVL, PSL, LSL, or OSL. The drawings included for the commentary have also been clarified.
5. Editorial changes include correction of the section titles and references to include "R" and adding "structural" prior to glued laminated timber to use the accepted terminology as in the code and related standard ANSI A190.1 *Product Standard for Structural Glued Laminated Timber.*
6. Please note the addition of many of the task group members as proponents of this public comment.

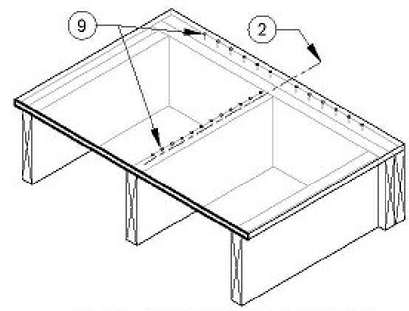
In the original published version of the monograph the drawings submitted with the proposal for inclusion in the commentary were not printed with the proposal. Although they were and continue to be accessed at the link provided in the reason statement they were requested by the committee to be included for the commentary. In the version of the proposal now available online the drawings have been included however the quality is poor. The drawings have been resubmitted with this proposal with the change to the drawing notes to clarify that of in addition to lumber, structural composite lumber is included as described in point 3 above.

The committee requested a better understanding of only the cost differential between current deficient construction of floors supporting guards and one that complies with the proposal without consideration of the corrective measures cited in the original cost impact statement. Please see the revised cost impact statement included in this public comment. Related to cost it is worthwhile to note that 2 x 8 floor systems are not precluded however a prescriptive solution is not offered here. It was our intent to provide a prescriptive that could be simply done with available materials and nails. Special hardware options similar to those provided for the hardening of 2 x 8 deck systems are not excluded and could be used to resist the additional rotation.

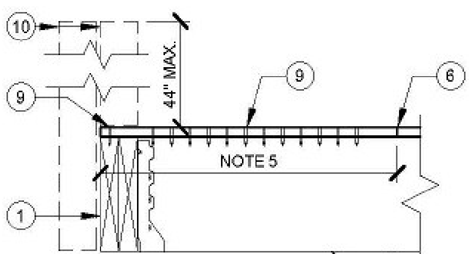
It cannot be emphasized strongly enough that ***this proposal corrects a dangerous deficit to building safety. Current code actually requires nullification of manufacturers' warranties*** as it is not possible to connect guard posts to voids in in a floor system that has not been engineered for guard connection. Current code does not provide a hardened floor system that is capable of resisting the required guard design load applied to the top of the guard. Specifically when guards and or blocking are added subsequent to engineering of a floor system and are not included in the engineered design it not only nullifies the engineered solution and any warranty of serviceability but could result in the failure of the guard system to serve its defined purpose to "...minimize the possibility of a fall from the walking surface to a lower level".



TOP VIEW: JOISTS PERPENDICULAR TO EDGE, GUARD POST ALIGNED WITH JOIST

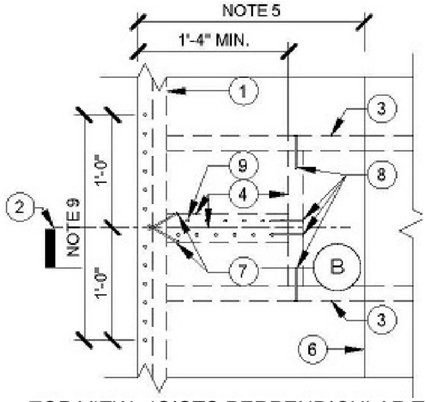


AXON: JOISTS PERP. TO EDGE, GUARD POST ALIGNED WITH JOIST

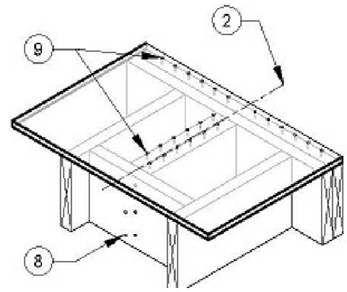


SECTION A

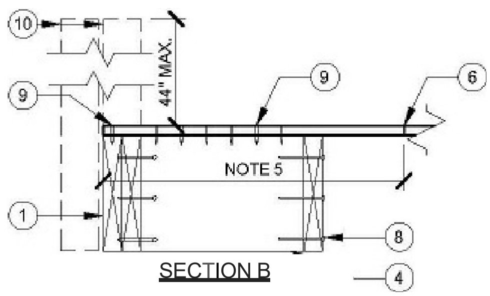
NOTES:
1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.



TOP VIEW: JOISTS PERPENDICULAR TO EDGE, GUARD POST OFFSET FROM JOISTS



AXON: JOISTS PERP. TO EDGE, GUARD POST OFFSET FROM JOISTS



SECTION B

NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
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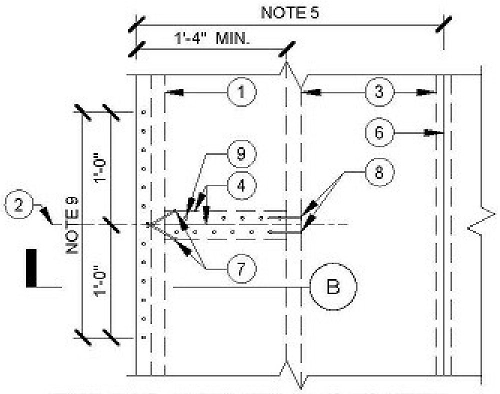
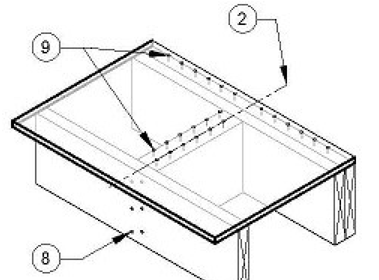
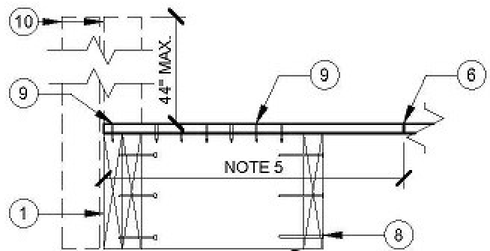


TOP VIEW: JOISTS PARALLEL TO EDGE



AXON: JOISTS PARALLEL TO EDGE



SECTION B

NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
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10. TOP- OR SIDE-MOUNTED GUARD POST.

Your approval of this public comment will correct a serious deficit in the code and improve building safety.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
An edge member of 16 linear feet would be comparable to the 3 post example cited in the original cost impact statement.

Prices below are based on an internet search on 5/28/22 that provided the following prices for 16 foot members:

2x10 Perpendicular Joist Header three Posts

2x10x16 Double Header +$28.00 (Single Joist Addition)

2x10 Bridging +$0 (3- scrap cut-offs)

Nails for toenail Fasteners +$2; Joist Hangers +$58

SCL Substitution for 2x10x16 Double Header +$250, Hangers +$58

<u>SLT Substitution for 2x10x16 Double Header +$330, Joist Hangers +$58</u>

2x10 Parallel Joist Header three Posts

Open Web Truss = -$75; I- Joist = -$65

2x10x16 Double Header +$56.00

2x10 Bridging +$7.00

Nails for toenail Fasteners +$2; Joist Hangers +$0

SCL Substitution for 2x10x16 Double Header +$250, Joist Hangers +$0

<u>SLT Substitution for 2x10x16 Double Header +$330, Joist Hangers +$0</u>

The options underlined are the most expensive material substitutions. The labor differential is negligible when considered in the original design from the start. It would be conservative to assume less than a $500.00 increase in materials. Compared to the costs of $400 - $800 to inadequately remedy the building safety deficit allowed in the code as identified in the proposal, **it would be conservative to indicate there would be no impact on the cost of construction.**

Final Hearing Results

RB173-22	AMPC1

RB174-22

Original Proposal

IRC: R506.1, R506.2 (New), PTI (New), Chapter 44

Proponents: Paul Armstrong, Post-Tensioned Institute; Kerry Sutton, American Concrete Institute, American Concrete Institute (kerry.sutton@concrete.org); Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org)

2021 International Residential Code

Revise as follows:

R506.1 General. Concrete slab-on-ground floors shall be designed and constructed in accordance with the provisions of this section or ACI 332. Such floors ~~Floors~~ shall be a minimum $3^1/_2$ inches (89 mm) thick (for *expansive soils*, see Section R403.1.8). The specified compressive strength of concrete shall be as set forth in Section R402.2.

Add new text as follows:

R506.2 Post-tensioned slab-on-ground floors. Post-tensioned concrete slabs-on-ground floors placed on expansive or stable soils shall be designed in accordance with PTI DC10.5.

Add new standard(s) as follows:

PTI DC10.5-19. Standard Requirements for Design and Analysis of Shallow Concrete Foundations on Expansive and Stable Soils

Reason: There are currently no provisions for designing post-tensioned slabs on expansive or stable soils in the IRC. This proposal includes a new reference to PTI standard PTI DC10.5-19, Standard Requirements for Design and Analysis of Shallow Concrete Foundations on Expansive and Stable Soils. Post-tensioned slabs are commonly used on stable soils for crack control as well as reduced slab thickness and non-prestressed steel use. This reduction in material use typically offsets the cost of the post-tensioning materials and labor. Additional documentation can be viewed at http://www.post-tensioning.org/Portals/13/Files/PDFs/Committees/PTI_DC10.5-19.pdf.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Post-tensioned slabs are commonly used on expansive and stable soils for crack control as well as reduced slab thickness and non-prestressed steel use. This reduction in material use typically offsets the cost of the posttensioning materials and labor.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal provides a needed standard for designing and analyzing shallow concrete foundations on expansive and stable soils. In addition, the proposed provision addresses the design of post-tensioned slabs on expansive or stable soils that are currently not addressed in the code (Vote: 9-0).

Final Hearing Results

RB174-22 AS

RB175-22

Original Proposal

IRC: R506.2.3
Proponents: Gary Ehrlich, NAHB, NAHB (gehrlich@nahb.org)

2021 International Residential Code

Revise as follows:

R506.2.3 Vapor retarder. A minimum 6 mil (0.006 inch; 152 µm) polyethylene or*approved* ~~10-mil (0.010 inch; 0.254 mm)~~vapor retarder ~~conforming to ASTM E1745 Class A requirements~~with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.

Exception: The vapor retarder is not required for the following:

1. Garages, utility buildings and other unheated*accessory structures*.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports.
3. Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. Where *approved* by the *building official*, based on local site conditions.

Reason: This amendment restores the minimum requirement for a 6 mil sheet vapor retarder under concrete slabs that existed prior to the 2021 IRC and removes the requirement for a 10 mil vapor retarder meeting ASTM D1745 Class A specifications. The language approved for the 2021 IRC limits product choice and significantly increases cost by requiring the use of proprietary underslab vapor retarder products as opposed to standard polyethylene sheet vapor retarders.
No technical data was provided that the 2021 change was necessary for houses. The proponents cited ACI 302.1R “Guide to Concrete Floor and Slab Construction” in their reason statement. However, ACI 302.1R is a guide intended for slabs in industrial, commercial, and institutional buildings, not residential buildings. No mention of houses is made anywhere in ACI 302.1R.

Even if one were inclined to apply the recommendations in ACI 302.1R to dwellings, the current edition does not specify a minimum thickness of vapor retarders complying with ASTM E1745, nor does it specify a class of vapor retarder (ASTM E1745 defines three classes – Class A, Class B and Class C – with Class A being the most stringent). The proponents of the code change for the 2021 IRC provided no substantiation as to why the most stringent class of underslab vapor retarder is necessary for a house. The proponents also referenced ACI 302.2R “Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials”, however many common floor coverings used in houses are permeable or semipermeable or do not rely on water-borne adhesives. They are not susceptible to trapping moisture coming up from the slab and thus do not need the protection of a thick, proprietary vapor retarder.

The proponents significantly underestimated the cost of their code change. An analysis conducted by Home Innovation Research Labs as part of their report “Estimated Costs of the 2021 IRC Code Changes” suggested the vapor retarder requirement could add from $540 to $1,100 to the cost of an average home, a high cost for a change that is not needed to protect the life safety of homeowners and their families.

Cost Impact: The code change proposal will decrease the cost of construction
An analysis conducted by Home Innovation Research Labs suggested restoring the traditional minimum requirement for 6 mil sheet polyethylene that existed through the 2018 IRC could reduce the cost of constructing an average home by $540 to $1,100.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the current code text is unnecessary for residential construction, and the added construction cost is concerning. In addition, the deleted text significantly increases the cost by requiring the use of proprietary underslab vapor retarder products as opposed to standard polyethylene sheet vapor retarders (Vote: 9-0).

Final Hearing Results

RB175-22	AS

RB176-22

Original Proposal

IRC: R317.1, R507.2.1, R507.9.1.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R317.1 Location required. Protection of wood and wood-based products from decay shall be provided in the following locations by the use of decay-resistant *naturally durable wood* or wood that is preservative-treated in accordance with AWPA U1.

1. In crawl spaces or unexcavated areas located within the periphery of the building foundation, wood joists or the bottom of a wood structural floor where closer than 18 inches (457 mm) to exposed ground, wood girders where closer than 12 inches (305 mm) to exposed ground, and wood columns where closer than 8 inches (204 mm) to exposed ground.
2. Wood framing members, including columns, that rest directly on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.
3. Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.
4. The ends of wood girders entering exterior masonry or concrete walls having clearances of less than $^1/_2$ inch (12.7 mm) on tops, sides and ends.
5. Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.
6. Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.
7. Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below *grade* except where an *approved* vapor retarder is applied between the wall and the furring strips or framing members.
8. Portions of wood structural members that form the structural supports of buildings, decks, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that prevents ~~would prevent~~ moisture or water accumulation on the surface or at joints between members.

   Exception: Sawn lumber used in structures ~~buildings~~ located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use naturally durable or preservative-treated wood where the structure is exposed to the weather.
9. Wood columns in contact with *basement* floor slabs unless supported by concrete piers or metal pedestals projecting not less than 1 inch (25 mm) above the concrete floor and separated from the concrete pier by an impervious moisture barrier.

R507.2.1 Wood materials. Wood structural members for joists, beams, and posts ~~materials~~ shall be No. 2 grade or better lumber, protected from decay where required by Section R317.1 and R317.1.2, and protected from termites where required by Section R318.1. ~~preservative-treated in accordance with Section R317, or *approved*, naturally durable lumber, and termite protected where required in accordance with Section R318.~~ Where design in accordance with Section R301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Cuts, notches and drilled holes of preservative-treated wood members shall be treated in accordance with Section R317.1.1. ~~All preservative-treated wood products in contact with the ground shall be *labeled* for such usage~~.

R507.9.1.1 Ledger details. Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, No. 2 grade or better

~~pressure-~~preservative-treated Southern pine, incised ~~pressure-~~preservative-treated hem-fir, or ~~*approved*,~~ <u>decay-resistant</u> *naturally durable* <u>*wood*</u>~~, No. 2 grade or better lumber~~. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

Reason: The intent of Section R507.2.1 when first added to the IRC was to require wood materials of deck construction to be decay resistant, whether treated or natural species. However, rather than repeat the AWPA referenced standard for treatment, the section pointed back to R317 in general. In 2021 the IRC was modified by other proponents in Section R317.1 item #8 where "balconies and porches" is discussed in regard to decay resistance. This section is not definitive that all materials must be decay resistant in the way R507.2.1 is for decks. This has led to confusion regarding the required decay resistance of deck wood materials. Is it required or not? Item 8 provides more flexibility to jurisdictions to evaluate the exact minimum threshold of each project design to determine if the characteristics contributing to decay are present. For this reason, it is most reasonable to change R507.2.1 to reference R317.1 for determining when decay resistance is required. However, note that R507.9.1.1 specifically requires deck ledgers to be decay resistant. This section is more specific and would thus always be required, universally, on deck ledgers. Deck ledger decay is not always visible, as it may be occurring on the backside due to a failure in the flashing detail. There is no redundant connection to the ledger. Therefore the hazard associated with decay is a greater risk and decay resistance is specifically required.

Terms were changed to "wood structural member" to match the language in the remaining text. "Buildings" was changed to "structures" in the exception since decks and porches are not buildings and the last sentence of the exception speaks to "structures". Clarification that Section R507.2.1 and the reference to R317.1 only applies to joists, beams, and posts, allows for decking not to be included for required decay resistance or grading. Many tropical hardwoods and other alternative wood decking materials are not graded lumber or naturally durable yet have had no history of insufficient performance as decking in the American market for at least two decades. Decay in decking is more easily visible to the occupant than the other structural members. The requirement for decay resistance is not to provide a greater useful service life, it is to reduce safety hazards due to unseen decay.

The modifications proposed to R507.9.1.1 are simply clean up associated with the subject of this proposal. The AWPA U1 standard provides methods of treatment that do not require "pressure" and the required field treatment in Section R317.1.1 is not a "pressure" treatment. Using this term is unnecessary. All lumber for ledgers using these prescriptive methods of attachment must be "No. 2 grade or better". Where currently located in the provision, it appears the grade requirement is only related to naturally durable wood. The definition is "naturally durable wood" so the term in the body of the code should be as defined and not "lumber". It also doesn't need to be "approved" because it is a defined term.

Cost Impact: The code change proposal will decrease the cost of construction
This code change will decrease the cost of deck construction in regions and designs where the wood materials are not subject to decay and in accordance with Section R317.1 do not require decay resistant materials.

Public Hearing Results

Committee Action	**As Modified**

Committee Modification:
R507.9.1.1 Ledger details. Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, No. 2 grade or better <u>pressure-</u>preservative-treated Southern pine, incised <u>pressure-</u>preservative-treated hem-fir, or decay-resistant *naturally durable wood*. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

Committee Reason: The committee decided that the modification reasonably added back "pressure" to maintain the requirements. The committee concluded that the proposal, as modified, clarifies the existing language to clarify confusing text regarding the required decay resistance of deck wood materials. Two committee members encouraged the proponent to address AWC concerns mentioned during the proposal hearing. For example, in Section 507.2.1, "materials" have been deleted, and an incomplete list has been added as "structural members for joists, beams, and posts". Decking and stairs are missing from the added list to Section 507.2.1. There was also a concern regarding deleting "All preservative-treated wood products in contact with the ground shall be labeled for such usage." in Section R507.2.1, Wood materials. For Section R507.9.1.1, Ledger details, the proponent did not justify why "No. 2 grade or better" has been added. Also, "preservative-treated" and "naturally durable" have been replaced with undefined terms (Vote: 9-1).

Public Comments

Public Comment 1

Proponents: Ed Lisinski, American Wood Council, American Wood Council (elisinski@awc.org) requests As Modified by Public Comment

Further modify as follows:

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R507.2.1 Wood materials. Wood structural members ~~for joists, beams, and posts~~ shall be ~~No. 2 grade or better lumber,~~ protected from decay where required by Section R317.1 and R317.1.2, and protected from termites where required by Section R318.1. Where design in accordance with Section R301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Sawn lumber for joists, beams and posts shall be No. 2 or better. Cuts, notches and drilled holes of preservative-treated wood members shall be treated in accordance with Section R317.1.1.

Commenter's Reason: This Public Comment further modifies the "Approved as Modified" version from the Committee Action Hearings. The version recommended for approval at the Committee Action Hearings limits the required used of preservative treated or naturally durable wood to “joists, beams and posts” and omits other structural members such as wood decking, wood stair treads and stringers, wood guards, and other wood structural members. This means that if the code change stands as currently proposed, the only elements on a wood deck that would require preservative treated or naturally durable wood are joists, beams and posts, and nothing else. The proposed change to this public comment restores the requirement for preservative treated or naturally durable wood to be more broadly applicable to all wood structural members in deck construction. However, it should be noted that such members are not required to be preservative treated or naturally durable wood where the geographic exception of R317.1 applies (i.e., where experience has demonstrated that climatic conditions preclude the need for such protection).
A second component of this Public Comment proposal relocates requirements for “joists, beams, and posts” to be No. 2 grade or better to the third sentence of R507.2.1 and decouples it from “wood structural members.” The abbreviated list of elements (i.e., "joists, beams and posts") might suggest by omission that other deck wood members such as deck boards and stair treads are not wood structural members. This language would also clarify that the requirement to have a No. 2 or better grade relates only to sawn lumber joists, beams and posts, which does not include decking or structural composite lumber wood products.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The final effect of the code change with the public comment should just be editorial and clarification of existing code requirements. If anything, there may be a slight decrease in cost of construction because currently in the code, "wood materials" are required to be preservative treated or naturally durable wood; whereas with this change, only "wood structural members" would be required to be preservative treated or naturally durable.

Final Hearing Results

RB176-22	AMPC1

RB177-22

Original Proposal

IRC: TABLE R507.2.3, ASTM Chapter 44

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS[a, b]

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING[e]
Nails and glulam rivets	In accordance with ASTM F1667	Hot-dipped galvanized per ASTM A153, Class D or ASTM A641 Class 3S for $^{3}/_{8}$-inch diameter and less	Stainless steel, silicon bronze or copper
Bolts[c] Lag screws[d](including nuts and washers)	In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for $^{3}/_{8}$-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze or copper
Metal connectors	Per manufacturer's specification	ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft^2 (total both sides)	Stainless steel

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Equivalent materials, coatings and finishes shall be permitted.

b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.

c. Holes for bolts shall be drilled a minimum $^{1}/_{32}$ inch and a maximum $^{1}/_{16}$ inch larger than the bolt.

d. Lag screws $^{1}/_{2}$ inch and larger shall be predrilled to avoid wood splitting per the*National Design Specification (NDS) for Wood Construction*.

e. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M ~~09a(2014)~~ 2019 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./ft². 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/ft².
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 aligns with current industry practices.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies the requirements for Nails that are made from galvanized wire coated with a minimum average coating weight of 1 oz/ft². This requirement is specified in ASTM A641, Class 3S. Class 3S was added to Specification ASTM A641 in 2019. The approval of this proposal is also consistent with the committee action RB133-22 (Vote:10-0).

Final Hearing Results

RB177-22	AS

RB178-22

Original Proposal

IRC: TABLE R507.2.3, R507.9.1.3

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS[a, b]

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING[e]
Nails and glulam rivets	In accordance with ASTM F1667	Hot-dipped galvanized per ASTM A153, Class D for $^{3}/_{8}$-inch diameter and less	Stainless steel, silicon bronze or copper
Bolts[c] Lag screws[d] (including nuts and washers)	In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for $^{3}/_{8}$-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze or copper
Metal connectors	Per manufacturer's specification	ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft^2 (total both sides)	Stainless steel

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Equivalent materials, coatings and finishes shall be permitted.

b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.

~~c Holes for bolts shall be drilled a minimum $^{1}/_{32}$ inch and a maximum $^{1}/_{16}$ inch larger than the bolt.~~

~~d Lag screws $^{1}/_{2}$ inch and larger shall be predrilled to avoid wood splitting per the *National Design Specification (NDS) for Wood Construction*.~~

e. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

R507.9.1.3 Ledger to band joist details. ~~Fasteners used in deck ledger connections~~Where ledgers are fastened in accordance with Table R507.9.1.3(1), fasteners shall comply with Section R507.2.3 ~~be hot-dipped galvanized or stainless steel~~ and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2). Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and holes 5/16-inch (7.9 mm) in diameter shall be drilled through the band joist prior to lag screw installation. Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and band joist prior to bolt installation.

Reason: 1) R507.9.3.1 is redundant and does not need to specify the properties of lag screws and bolts as this is the purpose of Table R507.2.3.

2) Table R507.2.3 is titled "Fastener and connector specifications for decks". This table provides material specifications for metal fasteners and connectors. It is not the appropriate place to present installation requirements in the footnotes (drilling of holes).

3) The NDS is a design document for engineers. It is not appropriate to reference such a document from the IRC for "installation" requirements of a prescriptive design.

4) The 2018 NDS provisions for lag screw installation are provided below. It is unrealistic to expect an IRC user to reference these engineering provisions and determine the specific gravity of the species of band joist the lag screw is fastening to.

NDS provisions

"12.1.4.2 Lead holes for lag screws loaded laterally and in withdrawal shall be bored as follows to avoid splitting of the wood member during connection fabrication.

A) The clearance hole for the shank shall have the same diameter as the shank, and the same depth of penetration as the length of the unthreaded shank.

B) The lead hole for the threaded portion shall have a diameter equal to 65% to 85% of the shank diameter in wood with G > 0.6, 60% to 75% in wood with 0.5 < G <= 0.6, and 40% to 70% in wood with G <= 0.5 (see Table 12.3.3A) and a length equal to at least the length of the threaded portion. The larger percentile in each range shall apply to lag screws of greater diameters."

5) 65% of a 1/2-inch diameter lag screw falls within the range for all three specific gravity and is thus an acceptable value for basic prescriptive code. This results in a 5/16-inch hole in the band joist as proposed in the relocated footnotes.

6) The allowable tolerance for holes for bolts being measured to a 32 of an inch is not practical for rough framing construction. A slight side-to-side movement of a hand tool while drilling is greater than a 32 of an inch. It is not necessary or realistic to require such precise values in prescriptive wood framing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact to this proposal, as it simply clarifies the intent of the IRC as currently written.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee's disapproval is due to some technical issues with the proposal that need to be addressed. During testimony, It was stated the ledger table was determined from testing that was done many years ago, but the committee did not have supporting evidence of how those ledgers were attached when those tests were done to verify the requirements. The committee suggested that the proponent work with AWC and look into predrilling requirements during the public comment phase. The committee agreed that the Wood Construction reference's National Design Specification (NDS) needs to be deleted (Vote: 6-5).

Public Comments

Public Comment 2

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com); David Tyree, American Wood Council, American Wood Council requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R507.2.3 Fasteners and connectors. Metal fasteners and connectors used for all decks shall be in accordance with Section R317.3 and Table R507.2.3. Holes for through bolts shall be drilled to a diameter of 1/32" to 1/16" larger than the bolt diameter. Connectors shall be installed in accordance with the manufacturer's approved instructions.

TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS[a, b]

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING[e]
Nails and glulam rivets	In accordance with ASTM F1667	Hot-dipped galvanized per ASTM A153, Class D for $^3/_8$-inch diameter and less	Stainless steel, silicon bronze or copper
Bolts	In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for $^3/_8$-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze or copper

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING
Lag screws(including nuts and washers)			
Metal connectors	Per manufacturer's specification	ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft^2 (total both sides)	Stainless steel

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Equivalent materials, coatings and finishes shall be permitted.

b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.

~~e~~c. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

R507.9.1.3 Ledger to band joist details. Where ledgers are fastened in accordance with Table R507.9.1.3(1), fasteners shall comply with Section R507.2.3 and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2). Holes for ½-inch (12.7 mm) lag screws shall be predrilled with two drill bits so that a hole 1/2-inch (12.7mm)in diameter ~~shall be~~is drilled through the ledger and sheathing, if present, and a hole~~s~~ 5/16-inch (7.9 mm) to 3/8 inch (9.5mm) in diameter ~~shall be~~is drilled through the band joist ~~prior to lag screw installation~~. ~~Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and band joist prior to bolt installation~~.

TABLE R507.9.1.3(1) DECK LEDGER CONNECTION TO BAND JOIST

LOAD[c] (psf)	JOIST SPAN[a] (feet)	ON-CENTER SPACING OF FASTENERS[b] (inches)		
		1/2-inch diameter lag screw with 1/2-inch maximum sheathing[d, e]	1/2-inch diameter bolt with 1/2-inch maximum sheathing[e]	1/2-inch diameter bolt with 1-inch maximum sheathing[f]
40 live load	6	30	36	36
	8	23	36	36
	10	18	34	29
	12	15	29	24
	14	13	24	21
	16	11	21	18
	18	10	19	16
50 ground snow load	6	29	36	36
	8	22	36	35
	10	17	33	28
	12	14	27	23
	14	12	23	20
	16	11	20	17
	18	9	18	15
60 ground snow load	6	25	36	36
	8	18	35	30
	10	15	28	24
	12	12	23	20
	14	10	20	17
	16	9	17	15

	18	8	15	13
70 ground snow load	6	22	36	35
	8	16	31	26
	10	13	25	21
	12	11	20	17
	14	9	17	15
	16	8	15	13
	18	7	13	11

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted. Extrapolation is not permitted.

b. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.

c. Dead Load = 10 psf. Snow load shall not be assumed to act concurrently with live load.

d. The tip of the lag screw shall fully extend beyond the inside face of the band joist. Lag screws shall be full-body diameter screws.

e. Sheathing shall be wood structural panel or solid sawn lumber.

f. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to $^{1}/_{2}$-inch thickness of stacked washers shall be permitted to substitute for up to $^{1}/_{2}$ inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

Commenter's Reason: The proponents of this Public Comment agree with most of the changes in the original proposal. However, there was one requirement, to drill a hole for a 1/2" bolt to a diameter of 1/2", that conflicted with the installation requirements for bolts in the AWC National Design Specification for Wood Construction (NDS).

1) Table R507.2.3 is titled “Fastener and connector specifications for decks”. This table provides material specifications for metal fasteners and connectors. It is not the appropriate place to present installation requirements in the footnotes (drilling of holes).

2) The current IRC lag screw installation requires that the hole be predrilled per the NDS. The NDS is a design document that deck builders probably won't have and may not be familiar with. IRC requirements should give an actual prescriptive requirement that can be followed in the field.

3) Having fastener corrosion resistance requirements in R507.9.3.1 is redundant because this is already specified in Table R507.2.3. It makes sense to remove them and just refer to Section R507.2.3.
The proponents of this Public Comment reviewed a report of the original testing that was performed at Washington State University to verify the fasteners that were used and how they were installed. The article "Residential Deck Ledger Connection Testing and Design" states that "As specified in the NDS (AF&PA, 2005), 3/8-inch diameter lead holes were drilled in the band joists and 1/2-inch diameter clearance holes were drilled through the deck ledgers and OSB sheathing prior to assembling the lag screwed specimens. For the bolted specimens, 9/16-inch diameter clearance holes were drilled through the band joists, OSB, and deck ledgers."

Specifications for installation of bolts is proposed to be added to Section R507.2.3, since through bolts are used in Section R507.5.2 in addition to R507.9.1.3. Lag screws are only used for ledger attachment so instructions for those is added to R507.9.1.3.

The new wording proposed in this Public Comment is meant to match that used for the testing that established the fastener spacing. In addition, since the article states that 1/2-inch diameter holes were drilled for the shank of the lag screws, that indicates that full-diameter body lag screws were used. So text was added in this Public Comment to require full-body diameter lag screws. Without that statement, reduced-body diameter lag screws could be used, and the load provided would be less than that achieved during the testing.

Bibliography: ""Residential Deck Ledger Connection Testing and Design", by David Carradine, Ph.D., Don Bender, P.E., Ph.D., Loe Loferski, Ph.D., and Frank Woeste, P.E., Ph.D. Structure Magazine, May 2008.
https://www.structuremag.org/?p=5620

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This PC does not change the intent of the original proposal. Instead, this PC further clarifies and relocates existing requirements of the code without causing any change in construction cost.

Final Hearing Results

RB178-22	AMPC2

RB179-22

Original Proposal

IRC: R507.3.1, TABLE R507.3.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.3.1 Minimum size. The minimum size of ~~concrete~~ deck footings shall be in accordance with Table R507.3.1, based on the tributary area and allowable soil-bearing pressure in accordance with Table R401.4.1.

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

LIVE OR GROUND SNOW LOAD[b] (psf)	TRIBUTARY AREA (ft^2)	LOAD-BEARING VALUE OF SOILS[a, c, d] (psf)								
		1,500[e]			2,000[e]			≥ 3,000[e]		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete Thickness (inches)[f]	Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete Thickness (inches)[f]	Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete Thickness (inches)[f]
40	5	7	8	6	7	8	6	7	8	6
	20	10	12	6	9	9	6	7	8	6
	40	14	16	6	12	14	6	10	12	6
	60	17	19	6	15	17	6	12	14	6
	80	20	22	7	17	19	6	14	16	6
	100	22	25	8	19	21	6	15	17	6
	120	24	27	9	21	23	7	17	19	6
	140	26	29	10	22	25	8	18	21	6
	160	28	31	11	24	27	9	20	22	7
50	5	7	8	6	7	8	6	7	8	6
	20	11	13	6	10	11	6	8	9	6
	40	15	17	6	13	15	6	11	13	6
	60	19	21	6	16	18	6	13	15	6
	80	21	24	8	19	21	6	15	17	6
	100	24	27	9	21	23	7	17	19	6
	120	26	30	10	23	26	8	19	21	6
	140	28	32	11	25	28	9	20	23	7
	160	30	34	12	26	30	10	21	24	8
60	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	12	6	9	10	6
	40	16	19	6	14	16	8	12	14	6
	60	20	23	7	17	20	6	14	16	6
	80	23	26	9	20	23	7	16	19	6
	100	26	29	10	22	25	8	18	21	6
	120	28	32	11	25	28	9	20	23	7
	140	31	35	12	27	30	10	22	24	8
	160	33	37	13	28	32	11	23	26	9
70	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	13	6	9	10	6
	40	18	20	6	15	17	6	12	14	6
	60	21	24	8	19	21	6	15	17	6
	80	25	28	9	21	24	8	18	20	6
	100	28	31	11	24	27	9	20	22	7
	120	30	34	12	26	30	10	21	24	8
	140	33	37	13	28	32	11	23	26	9
	160	35	40	15	30	34	12	25	28	9

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted, extrapolation not permitted.

b. Based on highest load case: Dead + Live or Dead + Snow.

c. Footing dimensions shall allow complete bearing of the post.

d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.

e. Area, in square feet, of deck surface supported by post and footings.

f. ~~Minimum thickness shall only apply to plain concrete footings~~.

Reason: Table R507.3.1 provides a minimum bearing area for round and square footings based on the loads and the soil bearing capacity. Only the minimum footing thickness column is based on the material of the footing being plain concrete footings (no reinforcing steel or other). Modifying section R507.3.1 by replacing “concrete” with “deck” where referencing Table R507.3.1 is a subtle alignment and reminder that the table simply provides a minimum horizontal bearing area sufficient for the loads and the soil type, independent of the footing material. Prescriptive design language in the IRC should be as generic as possible. There are proprietary footing products on the market made of alternative materials. The bearing area for these products need not be different than that of a concrete footing. This proposal would allow a bearing area to be selected from the code that can be used to select an appropriate size footer of any material. Including the term “plain concrete” in the thickness column achieves two goals. It makes it clear that the minimum thickness is only in relation to concrete footings, and it makes it clear that reinforcing steel (“rebar”) is not required. Footnotes are often overlooked so footnote f can be easily eliminated with the simply clarification in the column titles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies and expands the usefulness and potential application of prescriptive design methods. In itself, this does not affect the cost of construction

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal provides a reasonable correlation between the charging statement of Section R507.3.1 and Table R507.3.1 by replacing "concrete" with "deck". The committee also decided that deleting the table footnote and adding "plain concrete" in the thickness column clarifies that the minimum thickness is only in relation to concrete footings (Vote: 10-0).

Final Hearing Results

RB179-22 AS

RB180-22

Original Proposal

IRC: R507.4.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.4.1 Deck post to deck footing connection. Where posts bear on concrete footings in accordance with Section R403 and Figure R507.3, lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. ~~Other footing systems shall be permitted~~.

Exception: Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.

Reason: Though this line is supportive of alternative footing systems, it is unnecessary. Section R507.3 Footings, already states that "other approved structural systems…" are permitted. And, of course, R104.11 allows for alternative means, methods, and materials. As it is currently written, this line states that these "other systems" "shall be permitted". There is no mention of them having to be reviewed and approved. It just directly states that they "shall be permitted". This is inappropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Alternative methods of construction are always able to be reviewed and possibly approved. This proposal does not change that, therefore it does not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with the proponent that "Other footing systems shall be permitted" is unnecessary in Section R507.4.1. Section R507.3 Footings already states that "other approved structural systems…" are permitted (Vote: 9-1).

Final Hearing Results

RB180-22 AS

RB181-22

Original Proposal

IRC: R507.4.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.4.1 Deck post to deck footing connection. Where posts bear on concrete footings in accordance with Section R403 and Figure R507.3, lateral restraint shall be provided by ~~manufactured~~ *approved* connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. Other footing systems shall be permitted.

Exception: Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.

Reason: There is no known or defined magnitude of minimum lateral load resistance between a post and a footing utilizing any standard practices, codes, or design standards. The intent of this provision is to simply ensure some connection is made. Stating that it "shall be provided by manufactured connectors" provides no characteristics of this connection other than it being something "manufactured". Replacing "manufactured" with "approved" allows a building authority to make a rational determination as to whether a particular connection will provide sufficient lateral restraint to retain the post on the footing under normal usage. Until further research can provide an agreeable, minimum, measurable magnitude of resistance, we must continue to rely on the professional discretion of the building authority to determine acceptable connections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not have a definitive affect on the cost of construction. Use of the term "approved" as opposed to "manufactured" simply provides more discretion to the building official to approve this connection that is otherwise not provided for prescriptively in the IRC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies connectors' requirements. Replacing "manufactured" with "approved" ensures that a particular connection will provide sufficient lateral restraint to retain the post on the footing under normal usage (Vote: 10-0).

Final Hearing Results

RB181-22	AS

RB182-22

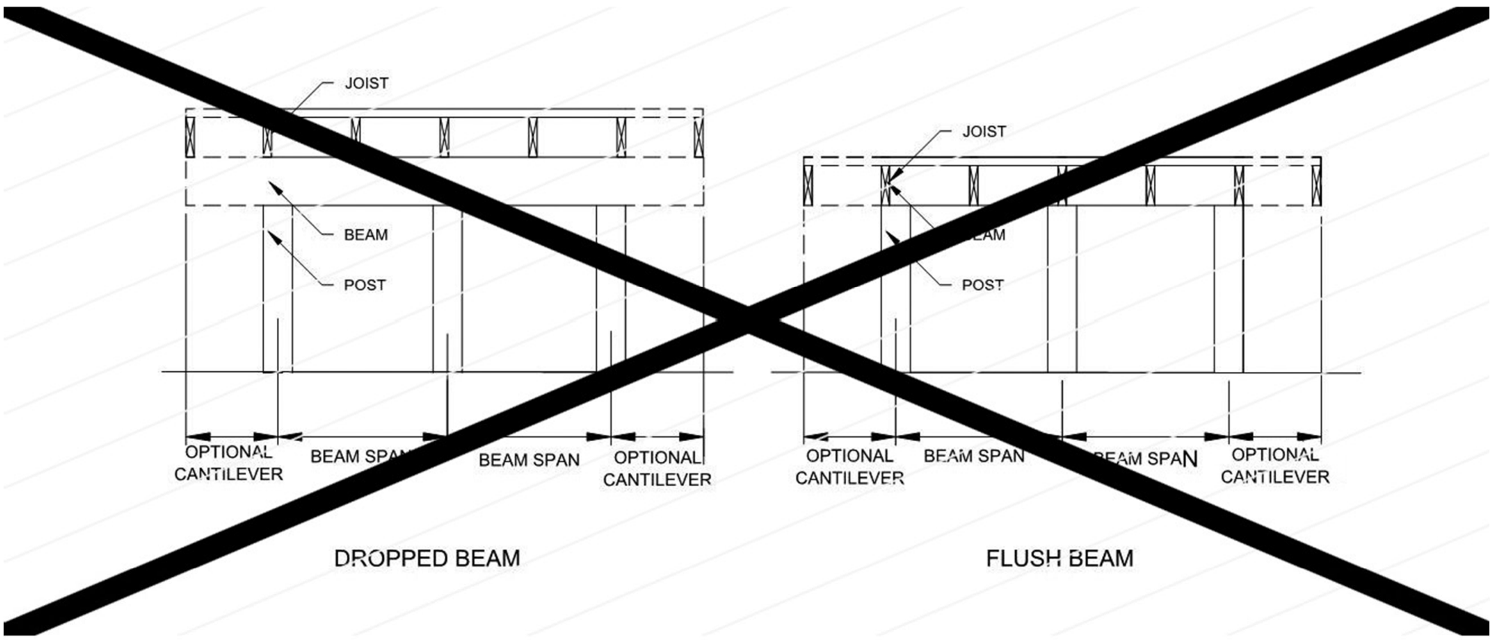
Original Proposal

IRC: FIGURE R507.5

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

2021 International Residential Code

Revise as follows:



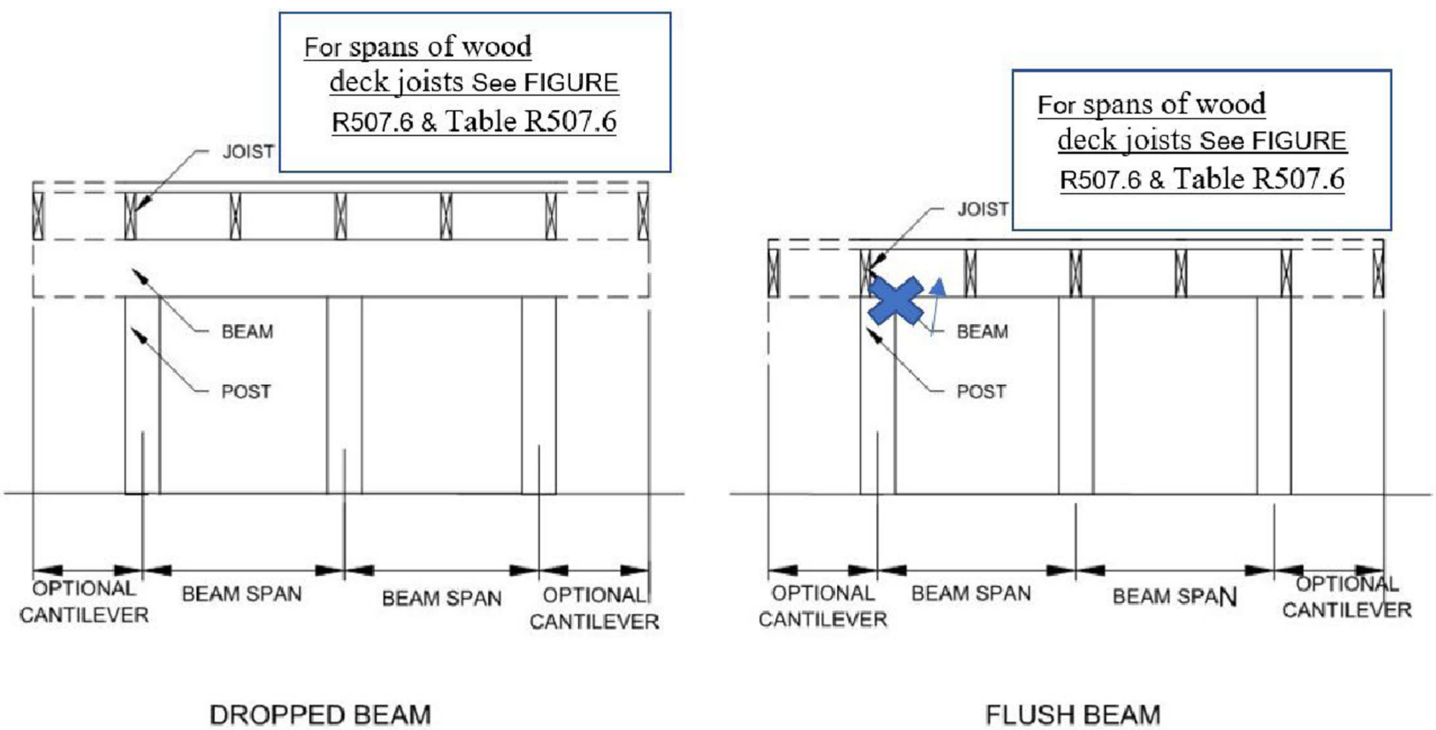


FIGURE R507.5 TYPICAL DECK ~~JOIST~~ BEAM SPANS

Reason: This proposal clarifies that FIGURE R507.5 shows TYPICAL DECK BEAM SPANS, not TYPICAL DECK JOIST SPANS. It also references the code users to the correct figure and table for TYPICAL DECK JOIST SPANS by adding “For spans of wood deck joists See FIGURE R507.6 & Table R507.6”. Also, the arrow of the beam is pointing to the joist, which is not correct. Therefore, the proposal changes the pointer to the beam to point to the beam.
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 clarification only for the requirements for wood deck joist in Figure R507.5.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal provides good clarification to the figure R507.5 by correcting the pointer to the joist, clarifying the reference to the joist's requirements, and fixing the table title (Vote10-0).

Final Hearing Results

RB182-22	AS

RB183-22

Original Proposal

IRC: R507.5, TABLE R507.5(1), TABLE R507.5(2), TABLE R507.5(3), TABLE R507.5(4), TABLE R507.5(5), FIGURE R507.5

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.5 Deck beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.5, shall be in accordance with Tables R507.5(1) through R507.5(4) and based on the joist span length and cantilever length as shown in Figure R507.6.Beam plies shall be fastened together with two rows of 10d (3-inch × 0.128-inch) nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span. Deck beams of other materials shall be permitted where designed in accordance with accepted engineering practices.

TABLE R507.5(1) MAXIMUM DECK BEAM SPAN—40 PSF LIVE LOAD[c]

	JOIST SPAN	**JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH~~[a, i]~~ (feet & feet)**									
	6	**6 & 0**	**6 & 1.5**								
	8		**8 & 0**	**8 & 1**	**8 & 2**						
	10			**10 & 0**	**10 & 1**	**10 & 2.5**					
	12				**12 & 0**	**12 & 1**	**12 & 2**	**12 & 3**			
	14					**14 & 0**	**14 & 1**	**14 & 2**	**14 & 3.5**		
	16						**16 & 0**	**16 & 1**	**16 & 2.5**	**16 & 4**	
	18							**18 & 0**	**18 & 1.5**	**18 & 3**	**18 & 4.5**
			EFFECTIVE DECK JOIST SPAN LENGTH[a, i, j] ~~(feet)~~								
			~~6~~		**~~8~~**	**10**	**-**	**12**	**14**	**16**	**18**
BEAM SPECIES[d]	**BEAM SIZE[e]**		**MAXIMUM DECK BEAM SPAN LENGTH~~[a, b, f]~~ (feet-inches) (feet-inches)[a, b, f]**								
Southern pine	1 – 2 × 6	4-10	4-7	4-3	4-0	3-7	3-5	3-3	3-0	2-10	2-8
	1 – 2 × 8	6-4	5-11	5-6	5-1	4-7	4-4	4-2	3-10	3-7	3-5
	1 – 2 × 10	7-6	7-0	6-6	6-0	5-5	5-2	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-8	8-3	7-8	7-1	6-4	6-1	5-10	5-5	5-0	4-9
	2 – 2 × 6	7-4	6-11	6-5	5-11	5-4	5-1	4-10	4-6	4-3	4-0
	2 – 2 × 8	9-4	8-9	8-2	7-7	6-9	6-5	6-2	5-9	5-4	5-0
	2 – 2 × 10	11-0	10-4	9-8	9-0	8-0	7-8	7-4	6-9	6-4	6-0
	2 – 2 × 12	13-0	12-2	11-4	10-7	9-5	9-0	8-7	8-0	7-5	7-0
	3 – 2 × 6	9-0	8-6	7-11	7-5	6-8	6-4	6-1	5-8	5-3	4-11
	3 – 2 × 8	11-7	10-11	10-3	9-6	8-6	8-1	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-11	13-0	12-1	11-2	10-0	9-7	9-2	8-6	7-11	7-6
	3 – 2 × 12	16-3	15-3	14-3	13-3	11-10	11-3	10-9	10-0	9-4	8-10
Douglas fir-larch[g] Hem-fir[g] Spruce-pine-fir	1 – 2 x 6	4-5	4-1	3-9	3-6	3-0	2-10	2-8	2-5	2-3	2-1
	1 – 2 × 8	5-11	5-6	5-1	4-8	4-0	3-9	3-6	3-2	2-11	2-9
	1 – 2 × 10	7-1	6-8	6-3	5-10	5-1	4-9	4-6	4-1	3-9	3-6
	1 – 2 × 12	8-3	7-9	7-3	6-9	6-0	5-9	5-6	5-0	3-9	3-6
	2 – 2 × 6	6-6	6-1	5-8	5-3	4-9	4-6	4-4	3-11	3-7	3-3
	2 – 2 × 8	8-8	8-2	7-7	7-1	6-4	6-0	5-9	5-2	4-8	4-4
	2 – 2 × 10	10-8	10-0	9-3	8-7	7-9	7-4	7-0	6-6	6-0	5-6
	2 – 2 × 12	12-4	11-7	10-9	10-0	8-11	8-6	8-2	7-7	7-1	6-8
	3 – 2 × 6	8-2	7-8	7-2	6-8	6-0	5-9	5-6	5-1	4-9	4-6
	3 – 2 × 8	10-11	10-3	9-6	8-10	7-11	7-7	7-3	6-8	6-3	5-11
	3 – 2 × 10	13-4	12-6	11-8	10-10	9-8	9-3	8-10	8-2	7-8	7-2
	3 – 2 × 12	15-6	14-6	13-6	12-7	11-3	10-9	10-3	9-6	8-11	8-5
Redwood[h]	1 – 2 × 6	4-5	4-2	3-10	3-7	3-1	2-11	2-9	2-6	2-3	2-2

h

Western cedars Ponderosa pine[h]	JOIST SPAN	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH (feet & feet)									
Red pine[h]	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					
	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5	16 & 4	
	18							18 & 0	18 & 1.5	18 & 3	18 & 4.5
			EFFECTIVE DECK JOIST SPAN LENGTH (feet)								
			~~6~~		~~8~~	10	-	12	14	16	18
BEAM SPECIES	BEAM SIZE		MAXIMUM DECK BEAM SPAN LENGTH (feet-inches) (feet-inches)								
	1 – 2 × 8	5-8	5-4	4-11	4-7	4-1	3-10	3-7	3-3	3-0	2-10
	1 – 2 × 10	6-11	6-6	6-0	5-7	5-0	4-9	4-7	4-2	3-10	3-7
	1 – 2 × 12	8-0	7-6	7-0	6-6	5-10	5-7	5-4	4-11	4-7	4-4
	2 – 2 × 6	6-7	6-2	5-9	5-4	4-10	4-7	4-5	4-0	3-8	3-4
	2 – 2 × 8	8-4	7-10	7-4	6-10	6-1	5-10	5-7	5-2	4-10	4-5
	2 – 2 × 10	12-2	9-7	8-11	8-4	7-5	7-1	6-9	6-3	5-10	5-6
	2 – 2 × 12	11-9	11-1	10-4	9-8	8-7	8-2	7-10	7-3	6-10	6-5
	3 – 2 × 6	8-1	7-8	7-2	6-9	6-0	5-9	5-6	5-1	4-9	4-6
	3 – 2 × 8	10-6	9-10	9-2	8-6	7-7	7-3	6-11	6-5	6-0	5-8
	3 – 2 × 10	12-9	12-0	11-2	10-5	9-4	8-11	8-6	7-10	7-4	6-11
	3 – 2 × 12	14-10	13-11	13-0	12-1	10-9	10-3	9-10	9-1	8-6	8-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation permitted for conditions with zero joist cantilever length. Extrapolation not permitted.

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load is not assumed to be concurrent with live load.

b. Beams supporting deck joists from one side only.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam's span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

j. ~~For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

TABLE R507.5(2) MAXIMUM DECK BEAM SPAN—50 PSF GROUND SNOW LOAD[c]

	JOIST SPAN	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH[a, i] (feet & feet)									
	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					

	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5		
	18							18 & 0	18 & 1.5	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		~~EFFECTIVE DECK JOIST SPAN LENGTH (feet)[a, i, j]~~								
			~~6~~		~~8~~	~~10~~		~~12~~	~~14~~	~~16~~	~~18~~
			MAXIMUM DECK BEAM SPAN LENGTH[a, b, f] (feet-inches) ~~(feet-inches)[a, b, f]~~								
Southern pine	1 – 2 × 6	4-9	4-6	4-2	3-11	3-6	3-4	3-2	2-11	2-9	2-7
	1 – 2 × 8	6-2	5-9	5-4	4-11	4-5	4-2	4-0	3-9	3-6	3-3
	1 – 2 × 10	7-2	6-9	6-3	5-10	5-3	5-0	4-9	4-5	4-2	3-11
	1 – 2 × 12	8-6	8-0	7-5	6-11	6-2	5-11	5-8	5-3	4-11	4-7
	2 – 2 × 6	7-1	6-8	6-2	5-9	5-2	4-11	4-9	4-4	4-1	3-10
	2 – 2 × 8	9-1	8-6	7-11	7-4	6-7	6-3	6-0	5-7	5-2	4-11
	2 – 2 × 10	10-9	10-1	9-5	8-9	7-10	7-5	7-1	6-7	6-2	5-10
	2 – 2 × 12	12-9	11-11	11-1	10-3	9-2	8-9	8-5	7-9	7-3	6-10
	3 – 2 × 6	8-3	7-11	7-6	7-2	6-6	6-2	5-11	5-6	5-1	4-10
	3 – 2 × 8	11-0	10-5	9-10	9-3	8-3	7-10	7-6	6-11	6-6	6-2
	3 – 2 × 10	13-6	12-8	11-9	10-11	9-9	8-4	8-11	8-3	7-9	7-3
	3 – 2 × 12	15-11	14-11	13-11	12-11	11-6	11-0	10-6	9-9	9-1	8-7
Douglas fir-larch[g] Hem-fir[g] Spruce-pine-fir[g]	1 – 2 × 6	4-3	4-0	3-8	3-5	2-11	2-9	2-7	2-4	2-2	2-0
	1 – 2 × 8	5-9	5-4	4-11	4-7	3-11	3-8	3-5	3-1	2-10	2-8
	1 – 2 × 10	7-0	6-7	6-1	5-8	4-11	4-8	4-5	4-0	3-8	3-5
	1 – 2 × 12	8-1	7-7	7-1	6-7	5-11	5-7	5-4	4-10	4-6	4-2
	2 – 2 × 6	6-5	6-0	5-7	5-2	4-7	4-4	4-2	3-10	3-5	3-2
	2 – 2 × 8	8-6	8-0	7-5	6-11	6-2	5-11	5-8	5-0	4-7	4-2
	2 – 2 × 10	10-5	9-9	9-1	8-5	7-7	7-3	6-11	6-4	5-10	5-4
	2 – 2 × 12	12-1	11-4	10-7	9-10	8-9	8-4	8-0	7-5	6-11	6-6
	3 – 2 × 6	8-0	7-6	7-0	6-6	5-9	5-6	5-3	4-11	4-7	4-4
	3 – 2 × 8	10-8	10-0	9-4	8-8	7-9	7-5	7-1	6-6	6-1	5-8
	3 – 2 × 10	13-1	12-3	11-5	10-7	9-6	9-1	8-8	8-0	7-6	7-0
	3 – 2 × 12	15-2	14-3	13-3	12-4	11-0	10-6	10-1	9-4	8-9	8-3
Redwood[h] Western cedars[h] Ponderosa pine[h] Red pine[h]	1 – 2 × 6	4-4	4-1	3-9	3-6	3-0	2-10	2-8	2-5	2-3	2-1
	1 – 2 × 8	5-6	5-2	4-10	4-6	4-0	3-9	3-6	3-2	2-11	2-9
	1 – 2 × 10	6-9	6-4	5-11	5-6	4-11	4-8	4-6	4-1	3-9	3-6
	1 – 2 × 12	7-10	7-4	6-10	6-4	5-8	5-5	5-2	4-10	4-6	4-3
	2 – 2 × 6	6-6	6-1	5-8	5-3	4-8	4-6	4-4	3-11	3-6	3-3

	2 – 2 × 8	8-2	7-8	7-2	6-8	5-11	5-8	5-5	5-0	4-8	4-3
	2 – 2 × 10	10-0	9-5	8-9	8-2	7-3	6-11	6-8	6-2	5-9	5-5
	2 – 2 × 12	11-8	10-11	10-2	9-5	8-5	8-0	7-8	7-2	6-8	6-3
	3 – 2 × 6	7-5	7-1	6-9	6-5	5-11	5-8	5-5	5-0	4-8	4-5
	3 – 2 × 8	9-10	9-4	8-10	8-4	7-5	7-1	6-10	604	5-11	5-7
	3 – 2 × 10	12-6	11-9	10-11	10-2	9-1	8-8	8-4	7-8	7-2	6-9
	3 – 2 × 12	14-7	13-8	12-9	11-10	10-7	10-1	9-8	8-11	8-4	7-10

For SI: 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation ~~allowed~~ permitted for conditions with zero joist cantilever length.Extrapolation not permitted. i~~s not allowed.~~

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam’s span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

j. ~~For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

TABLE R507.5(3) MAXIMUM DECK BEAM SPAN—60 PSF GROUND SNOW LOAD[c]

	JOIST SPAN	JOIST SPAN LENGTH & JOIST CANTILEVER LENGTH[a, i] (feet & feet)									
	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					
	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5	16 & 4	
	18							18 & 0	18 & 1.5	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		EFFECTIVE DECK JOIST SPAN LENGTH~~[a, i, j]~~ (feet)								
			~~6~~		~~8~~	10		12	14	16	18
			MAXIMUM DECK BEAM SPAN LENGTH~~[a, b, f]~~ (feet-inches) (feet-inches)[a, b, f]								
Southern pine	1 – 2 × 6	4-5	4-2	3-10	3-7	3-3	3-1	2-11	2-9	2-6	2-5
	1 – 2 × 8	5-7	5-3	4-11	4-7	4-1	3-11	3-9	3-5	3-3	3-0

	1 – 2 × 10	6-8	6-3	5-10	5-5	4-10	4-7	4-5	4-1	3-10	3-7
	1 – 2 × 12	7-11	7-5	6-11	6-5	5-9	5-6	5-3	4-10	4-6	4-3
	2 – 2 × 6	6-7	6-2	5-9	5-4	4-9	4-6	4-4	4-0	3-9	3-7
	2 – 2 × 8	8-4	7-10	7-4	6-10	6-1	5-10	5-7	5-2	4-10	4-6
	2 – 2 × 10	9-10	9-4	8-8	8-1	7-3	6-11	6-7	6-1	5-8	5-4
	2 – 2 × 12	11-9	11-0	10-3	9-6	8-6	8-1	7-9	7-2	6-9	6-4
	3 – 2 × 6	7-9	7-5	7-1	6-9	6-0	5-9	5-6	5-1	4-9	4-6
	3 – 2 × 8	10-4	9-9	9-1	8-6	7-8	7-3	6-11	6-5	6-0	5-8
	3 – 2 × 10	12-5	11-8	10-11	10-2	9-1	8-8	8-3	7-8	7-2	6-9
	3 – 2 × 12	14-8	13-9	12-10	11-11	10-8	10-2	9-9	9-0	8-5	7-11
Douglas fir-larch[g] Hem-fir[g] Spuce-pine-fir[g]	1 – 2 × 6	3-11	3-8	3-4	3-1	2-8	2-6	2-4	2-2	2-0	1-10
	1 – 2 × 8	5-5	5-0	4-6	4-1	3-6	3-3	3-1	2-10	2-7	2-5
	1 – 2 × 10	6-6	6-1	5-7	5-2	4-6	4-3	4-0	3-7	3-4	3-2
	1 – 2 × 12	7-7	7-1	6-7	6-1	5-5	5-1	4-10	4-5	4-1	3-10
	2 – 2 × 6	5-10	5-6	5-1	4-9	4-3	4-0	3-10	3-5	3-1	2-10
	2 – 2 × 8	7-11	7-5	6-11	6-5	5-9	5-4	5-0	4-6	4-1	3-9
	2 – 2 × 10	9-7	9-0	8-5	7-10	7-0	6-8	6-4	5-9	5-2	4-10
	2 – 2 × 12	11-2	10-6	9-9	9-1	8-1	7-9	7-5	6-10	6-4	5-10
	3 – 2 × 6	7-4	6-11	6-5	6-0	5-4	5-1	4-11	4-6	4-2	3-10
	3 – 2 × 8	9-10	9-3	8-7	8-0	7-2	6-10	6-6	6-1	5-6	5-0
	3 – 2 × 10	12-1	11-4	10-7	9-10	8-9	8-4	8-0	7-5	6-11	6-5
	3 – 2 × 12	13-6	13-2	11-9	11-5	10-2	9-9	9-4	8-7	8-1	7-7
Redwood[h] Western cedars[h] Ponderosa pine[h] Red pine[h]	1 – 2 × 6	4-0	3-9	3-5	3-2	2-9	2-7	2-5	2-2	2-0	1-11
	1 – 2 × 8	5-2	4-10	4-6	4-2	3-7	3-4	3-2	2-11	2-8	2-6
	1 – 2 × 10	6-2	5-10	5-5	5-1	4-6	4-3	4-1	3-8	3-5	3-3
	1 – 2 × 12	7-3	6-10	6-4	5-11	5-3	5-0	4-10	4-5	4-2	3-11
	2 – 2 × 6	5-11	5-7	5-2	4-10	4-4	4-1	3-11	3-6	3-2	2-11
	2 – 2 × 8	7-6	7-1	6-7	6-2	5-6	5-3	5-0	4-7	4-2	3-10
	2 – 2 × 10	9-3	8-8	8-1	7-6	6-9	6-5	6-2	5-8	5-4	4-11
	2 – 2 × 12	10-8	10-1	9-5	8-9	7-10	7-6	7-2	6-7	6-2	5-10
	3 – 2 × 6	6-11	6-8	6-4	6-1	5-5	5-2	5-0	4-7	4-3	3-11
	3 – 2 × 8	9-3	8-9	8-3	7-9	6-11	6-7	6-4	5-10	5-5	5-3
	3 – 2 × 10	11-8	10-11	10-2	9-5	8-5	8-0	7-8	7-3	6-8	6-3
	3 – 2 × 12	13-6	12-8	11-9	10-11	9-9	8-4	8-11	8-3	7-9	7-3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation ~~allowed~~ permitted for conditions with zero joist cantilever length.Extrapolation not permitted. ~~is not allowed.~~

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam's span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

j. ~~For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

TABLE R507.5(4) MAXIMUM DECK BEAM SPAN—70 PSF GROUND SNOW LOAD[c]

	JOIST SPAN	JOIST SPAN LENGTH & CANTILEVER LENGTH[a, i] (feet & feet)									
	6	6 & 0	6 & 1.5								
	8		8 & 0	8 & 1	8 & 2						
	10			10 & 0	10 & 1	10 & 2.5					
	12				12 & 0	12 & 1	12 & 2	12 & 3			
	14					14 & 0	14 & 1	14 & 2	14 & 3.5		
	16						16 & 0	16 & 1	16 & 2.5	16 & 4	
	18							18 & 0	18 & 1	18 & 3	18 & 4.5
BEAM SPECIES[d]	BEAM SIZE[e]		EFFECTIVE DECK JOIST SPAN LENGTH (feet)[a, i, j]								
			~~6~~		~~8~~	10		12	14	16	18
			MAXIMUM DECK BEAM SPAN LENGTH[a, b, f] (feet-inches) (feet-inches)[a, b, f]								
Southern pine	1 – 2 × 6	4-2	3-11	3-7	3-4	3-0	2-10	2-9	2-6	2-4	2-3
	1 – 2 × 8	5-4	4-11	4-8	4-3	3-10	3-8	3-6	3-3	3-0	2-10
	1 – 2 × 10	6-2	5-10	5-5	5-1	4-6	4-4	4-2	3-10	3-7	3-4
	1 – 2 × 12	7-4	6-11	6-5	6-0	5-4	5-1	4-11	4-6	4-3	4-0
	2 – 2 × 6	6-3	5-9	5-4	5-0	4-6	4-3	4-1	3-9	3-6	3-4
	2 – 2 × 8	7-10	7-4	6-10	6-4	5-8	5-5	5-2	4-10	4-6	4-3
	2 – 2 × 10	9-6	8-9	8-2	7-7	6-9	6-5	6-2	5-8	5-4	5-0
	2 – 2 × 12	10-11	10-3	9-7	8-11	8-0	7-7	7-3	6-9	6-3	5-11
	3 – 2 × 6	7-4	7-0	6-7	6-3	5-7	5-4	5-1	4-9	4-5	4-2
	3 – 2 × 8	9-10	9-3	8-7	8-0	7-2	6-10	6-6	6-0	5-8	5-4
	3 – 2 × 10	11-7	10-11	10-2	9-6	8-6	8-1	7-9	7-2	6-8	6-4
	3 – 2 × 12	13-9	12-11	12-0	11-2	10-0	9-6	9-1	8-5	7-11	7-5

Douglas fir-larch[g] Hem-fir[g] Spruce-pine-fir[g]	1 – 2 × 6	3-8	3-5	3-1	2-10	2-5	2-3	2-2	2-0	1-10	1-9
	1 – 2 × 8	4-10	4-7	4-1	3-8	3-2	3-0	2-10	2-7	2-5	2-4
	1 – 2 × 10	6-1	5-8	5-2	4-9	4-1	3-10	3-8	3-4	3-1	2-11
	1 – 2 × 12	7-0	6-7	6-1	5-8	5-0	4-9	4-6	4-1	3-10	3-7
	2 – 2 × 6	5-6	5-2	4-10	4-6	4-0	3-8	3-5	3-1	2-10	2-7
	2 – 2 × 8	7-4	6-11	6-5	6-0	5-3	4-11	4-7	4-1	3-8	3-5
	2 – 2 × 10	8-11	8-5	7-10	7-4	6-6	6-2	5-10	5-2	4-9	4-5
	2 – 2 × 12	10-6	9-10	9-2	8-6	7-7	7-3	6-11	6-4	5-9	5-4
	3 – 2 × 6	6-11	6-6	6-0	5-7	5-0	4-9	4-7	4-2	3-9	3-5
	3 – 2 × 8	9-3	8-8	8-1	7-6	6-8	6-4	6-1	5-6	5-0	4-7
	3 – 2 × 10	11-3	10-7	9-10	9-2	8-2	7-10	7-6	6-11	6-4	5-10
	3 – 2 × 12	13-2	12-4	11-6	10-8	9-7	9-2	8-9	8-1	7-7	7-1
Redwood[h] Western cedars[h] Ponderosa pine[h] Red pine[h]	1 – 2 × 6	3-9	3-6	3-2	2-11	2-6	2-4	2-3	2-0	1-11	1-9
	1 – 2 × 8	4-10	4-6	4-2	3-10	3-3	3-1	2-11	2-8	2-6	2-4
	1 – 2 × 10	5-10	5-6	5-1	4-9	4-2	3-11	3-9	3-5	3-2	3-0
	1 – 2 × 12	6-9	6-4	5-11	5-6	4-11	4-8	4-6	4-2	3-11	3-8
	2 – 2 × 6	5-7	5-3	4-11	4-7	4-1	3-9	3-6	3-2	2-11	2-8
	2 – 2 × 8	7-1	6-8	6-2	5-9	5-2	4-11	4-8	4-2	3-10	3-6
	2 – 2 × 10	8-8	8-2	7-7	7-1	6-4	6-0	5-9	5-4	4-10	4-6
	2 – 2 × 12	10-0	9-5	8-9	8-2	7-4	7-0	6-8	6-2	5-9	5-5
	3 – 2 × 6	6-8	6-4	6-0	5-8	5-1	4-10	4-8	4-3	3-10	3-6
	3 – 2 × 8	8-10	8-4	7-9	7-3	6-5	6-2	5-11	5-5	5-1	4-8
	3 – 2 × 10	10-10	10-2	9-6	8-10	7-11	7-6	7-2	6-8	6-3	5-11
	3 – 2 × 12	12-7	11-10	11-0	10-3	9-2	8-9	8-4	7-9	7-3	6-10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation ~~allowed~~ permitted for conditions with zero joist cantilever length. Extrapolation not permitted. ~~is not allowed~~.

b. Beams supporting a single span of joists with or without cantilever.

c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.

d. No. 2 grade, wet service factor included.

e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.

f. Beam cantilevers are limited to the adjacent beam's span divided by 4.

g. Includes incising factor.

h. Incising factor not included.

i. Deck joist span as shown in Figure R507.5.

j. ~~For calculation of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5).~~

Delete without substitution:

~~TABLE R507.5(5) JOIST SPAN FACTORS FOR CALCULATING EFFECTIVE DECK JOIST SPAN [for use with Note j in Tables R507.5(1), R507.5(2), R507.5(3) and R507.5(4)]~~

C/J[a]	JOIST SPAN FACTOR
0 (no cantilever)	0.66
1/12 (0.87)	0.72
1/10 (0.10)	0.80
1/8 (0.125)	0.84
1/6 (0.167)	0.90
1/4 (0.250)	1.00

~~For SI: 1 foot = 304.8 mm~~.

a. ~~C = actual joist cantilever length (feet); J = actual joist span length (feet).~~

Revise as follows:

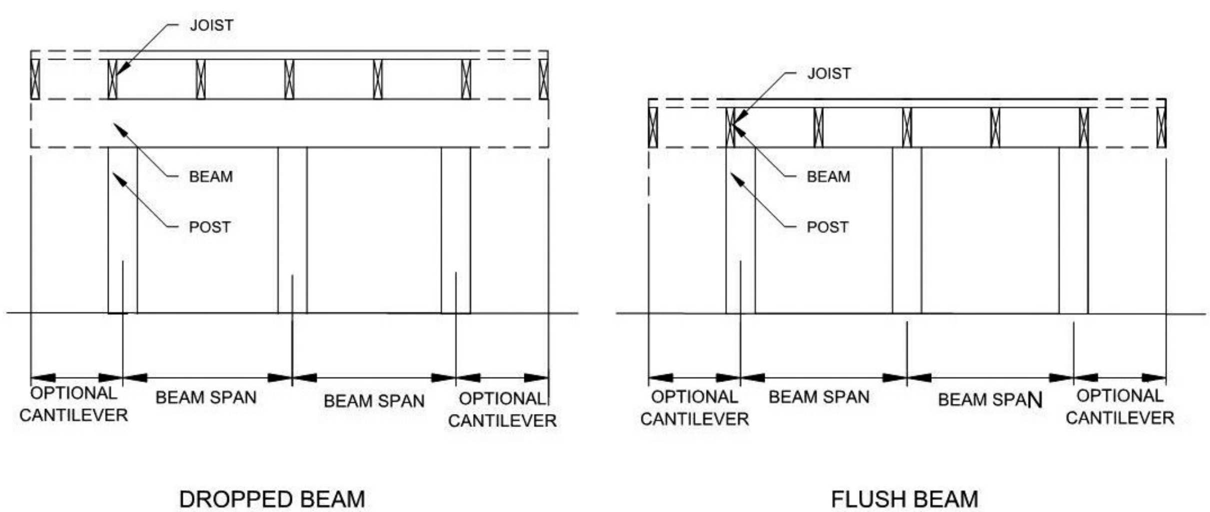


FIGURE R507.5 TYPICAL DECK ~~JOIST~~ BEAM SPANS

Reason: Since first appearing in the the 2015 IRC, Table R507.5 for deck beam sizing has always assumed a load from joists cantilevering their maximum amount beyond the beam. In most conditions, joists can cantilever beyond a beam up to 1/4 their back span, and this entire load is placed on the beam. This places up to 50 percent more load on the beam than a joist that does not cantilever beyond. For example, a joist that spans 12 feet with no cantilever loads the beam with 6 feet. But with an additional 3-foot cantilever, the beam is now loaded with 9 feet. Currently, Table R507,5 sizes every beam based only on the joist span, and simply includes the additional maximum cantilever loading every time. When there is no cantilever, or less than the maximum, the beam is being oversized or overly restricted in

maximum span. For a 12 foot joist span with no cantilever, the beam is sized for 9 feet of joist. This is equivalent to an 18-foot joist span with no cantilever.
It is woefully inaccurate to size a minimum beam for a 12-foot joist span based on loads from a 18-foot span.

In 2021 a new table was added in the footnotes of Table R507.5 that provided a factor based on the actual cantilever to joist span ratio. This factor could then be used for the input joist span value in order to generate an accurately sized beam. Though this adjustment method works, it is incredibly inconvenient and not user friendly. This proposal eliminates this footnote and its table and embeds various joist span and cantilever combinations in an expanded heading that is currently shown as only joist span. Each column that currently represent a joists span and it's maximum cantilever has been expanded to show equivalent spans and cantilever combinations. Each combination in the same column loads the beam equivalent or slightly less. Note that under the previous "effective joist span length" column for 12 feet, the new heading reveals that this column covers four different designs, an 18 foot span with no cantilever (18 & 0), a 16 foot span with a 1 foot cantilever (16 & 1), and 14 foot span with a 2 foot cantilever (14 & 2), and a 12 foot span with a 3 foot cantilever (12 & 3).

A 6 foot joist span with a 1.5 foot cantilever was the first column in the current table. In order to provide a beam size for each joist span length from 6 feet to 18 feet and with zero cantilever length, a new column was added at the left of the table.

The footnote for interpolation was modified to only permit interpolation between columns for evaluating joists with no cantilever. For example, a 13 foot joist span with no cantilever, could be easily interpolated by taking the value between the (12 & 0) and (14 & 0) columns. However, trying to interpolate a 13 foot span with a 2 foot cantilever is not quite so simply and would invite error.

To further clarify the use of the beam span table, Section R507.5 was modified to reference the joist span length and joist cantilever length and point the reader to Figure R507.6 which illustrates these terms.

Figure R507.5 for deck BEAMS is incorrectly titled "JOIST". This merely editorial, perhaps errata, perhaps mistake. Let's fix it!

Cost Impact: The code change proposal will decrease the cost of construction
This proposal provides three new columns of maximum beam spans within the table, which allows beams to be sized more accurately, and thus not oversized and more expensive. The current beam span table sizes beams with the assumption that the joists are fully cantilevered beyond the beam. This is 50% more loading on the beam than when there is no joist cantilever. When there is no joist cantilever or less than the maximum, the beam is oversized and more expensive. A footnote with a complicated cantilever to joist ratio table yielding a factor to adjust the input joist span for a more accurate beam size is available. However, it is very difficult to use and not convenient. Offering a way to quickly size the beam based on a few different cantilever lengths, allows a more affordable beam to be sized and purchased.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approval is based on the fact that the proposal eliminates the footnotes of Table R507.5 and its table and embeds various joist span and cantilever combinations in an expanded heading that is currently shown as only joist span. The reformulation of the table is very beneficial to the code users (Vote: 10-0).

Final Hearing Results

RB183-22 AS

RB184-22

Original Proposal

IRC: R507.5, R507.5.1, R507.5.2, FIGURE R507.5.1(1), FIGURE R507.5.1(2), R507.6.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

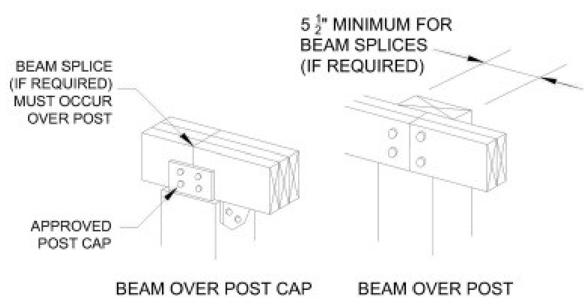
2021 International Residential Code

Revise as follows:

R507.5 Deck beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.5, shall be in accordance with Tables R507.5(1) through R507.5(4). Beam plies shall be fastened together with two rows of 10d (3-inch × 0.128-inch) nails minimum at 16 inches (406 mm) on center along each edge. ~~Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span~~. Deck beams of other materials shall be permitted where designed in accordance with accepted engineering practices.

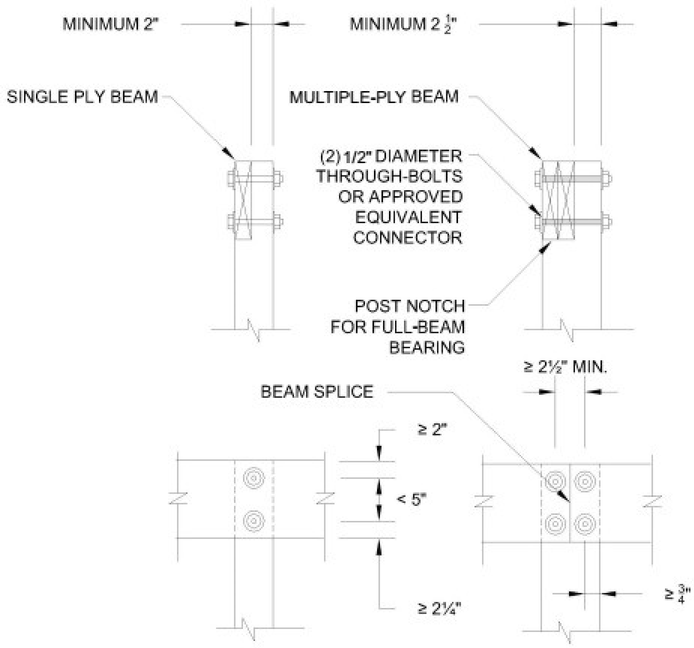
R507.5.1 Deck beam bearing. Beams and individual beam plies of built-up beams shall be continuous between bearing locations and continuous across bearing locations supporting beam cantilevers. Beams shall be permitted to cantilever beyond bearing locations up to one fourth of the actual beam span. The ends of beams shall have not less than $1^1/_2$ inches (38 mm) of bearing length on wood or metal and not less than 3 inches (76 mm) of bearing length on concrete or masonry for the entire width of the beam. ~~Where multiple-span beams bear on intermediate posts, each ply must have full bearing on the post in accordance with Figures R507.5.1(1) and R507.5.1(2).~~

R507.5.2 Deck beam connection to supports. Deck beams shall be connected to supporting members to prevent lateral ~~attached to supports in a manner capable of transferring vertical loads and resisting horizontal~~ displacement. Deck beam connections to wood posts shall be in accordance with Figures R507.5.2(1) and R507.5.2(2) ~~R507.5.1(1) and R507.5.1(2)~~. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. Bolts shall have washers under the head and nut.



For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.5.1(1)~~ R507.5.2(1) DECK BEAM TO DECK POST



For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.5.1(2)~~ R507.5.2(2) NOTCHED POST-TO-BEAM CONNECTION

R507.6.1 Deck joist bearing. The ends of joists shall have not less than $1^1/_2$ inches (38 mm) of bearing length on wood or metal and not less than 3 inches (76 mm) of bearing length on concrete or masonry over its entire width. Joists bearing on top of a multiple-ply beam or ledger shall be fastened in accordance with Table R602.3(1). Joists bearing on top of a single-ply beam or ledger shall be attached by a mechanical connector. Joist framing into the side of a beam or ledger board shall be supported by *approved* joist hangers.

Reason: 1) There is still uncertainty by some code readers as to whether each end of each ply of a multi-ply ("built-up") beam must be supported on a bearing location. This is indeed the intent and is what this proposal attempts to clarify. Please note that in prescriptive wood frame construction, this has always been the rule. The 1931 edition of "Light Frame House Construction" by the Federal Board of Vocational Education" provides the following on page 40: "At the point of bearing the beam should be carefully sized, so that every piece of the built-up girder is in full contact with the support".
2) The term "length" was included to clarify the direction of the minimum bearing measurement. This term compliments the existing term "width" regarding the beam.
3) The reference to Figures R507.5.1(1) and (2) was removed in section R507.5.1 "deck beam bearing", because those figures speak to the connection of the beam to the post and not the bearing. A reference to those figures is already provided in the section on beam connections, Section R507.5.2. Along with this change, the two Figures need to be given a new section number title that matches the section they are referenced from (deck beam connection). (Table R507.5.2(1) and (2))
4) The allowance for beam cantilevers was moved to the section about beam bearing, as it is related to the need for all beam plies to be continuous over the last bearing point to support the cantilever.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the existing intent of these sections and therefore does not directly affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies the confusion of whether each end of each ply of a multi-ply ("built-up") beam must be supported on a bearing location. In addition, the proposal clarifies the reference to Figures R507.5.1(1) and (2) by removing them from

Section R507.5.1 “deck beam bearing” because those figures address the connection of the beam to the post and not the bearing. The two figures are given a new section number title that matches the section they are referenced from (deck beam connection) (Vote: 10-0).

Final Hearing Results

RB184-22	AS

RB185-22

Original Proposal

IRC: R507.7

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.7 Decking. Maximum allowable spacing for joists supporting wood decking, excluding *stairways*, shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d <u>deformed</u> ~~threaded~~ nails or two No. 8 wood screws. Maximum allowable spacing for joists supporting *plastic composite* decking shall be in accordance with Section R507.2. Other *approved* decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

Reason: The fasteners specified are not based on any known magnitude of load resistance, thus they need not be so specific. "Threaded" is a very specific nail shank design, however the intent of this IRC provision is simply to provide additional friction between the shank and the wood than a smooth shank provides. The term "threaded nails" is not used anywhere else in the IRC. The term "deformed nails" is more generic, as it could be ring, threaded, or otherwise designed to increase friction. This term is used in the following IRC provisions: Table R602.3(1), R703.3.3, and Table R905.1.1(3). Using the term "deformed" will broaden the allowable products available for use in decking fastening and increase the consistency of terms used in the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply broadens the available shank design of nails in prescriptive design methods. In itself, this does not affect the cost of construction. It simply provides greater freedom in construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
R507.7 Decking. Maximum allowable spacing for joists supporting wood decking, excluding *stairways*, shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d deformed <u>shank</u> nails or two No. 8 wood screws. Maximum allowable spacing for joists supporting *plastic composite* decking shall be in accordance with Section R507.2. Other *approved* decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

Committee Reason: The committee concluded that the modification clarifies the terminology. The committee determined that the proposal as modified proposes editorial change to replace the term "threaded nails" with "deformed". "Threaded nails" is a specific term and is not used anywhere else in the IRC. The term "deformed" is generic (Vote: 10-0).

Final Hearing Results

RB185-22	AM

RB186-22

Original Proposal

IRC: R507.7

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.7 Decking. Maximum allowable spacing for joists supporting wood decking, excluding *stair* treads ~~*stairways*~~, shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws. Maximum allowable spacing for joists supporting *plastic composite* decking shall be in accordance with Section R507.2. Other *approved* decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

Reason: The decking spans (joist spacing) provided in R507.7 are not designed to support the 300 pound concentrated design load required for "stair treads" under footnote c in Table R301.5. This additional load is only required on "stair treads", as specifically stated in Table R301.5.
A "stairway" includes the top, bottom, and intermediate landings. These landings are often constructed like decks and the landings do not require the additional concentrated load required on "stair treads". Therefore, the exclusion for using Table R507.7 should be for "stair treads" and not "stairways". The construction of the stairway landing decking does not need to be excluded from the provisions of R507.7

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposals has the potential to reduce construction costs by allowing for prescriptive design of decking for stairway landings that is not currently provided in the IRC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies that the exclusion for using Table R507.7 should be for "stair treads" and not "stairways". A "stairway" includes the top, bottom, and intermediate landings, while the additional load is only required on "stair treads", as stated explicitly in Table R301.5 (Vote: 10-0).

Final Hearing Results

RB186-22 AS

RB187-22

Original Proposal

IRC: TABLE R507.9.1.3(2)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger[a]	2 inches[d]	3/4 inch	2 inches[b]	1 5/8 inches[b]
Band Joist[c]	3/4 inch	2 inches	2 inches[b]	1 5/8 inches[b]

For SI: 1 inch = 25.4 mm.

a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.9.1.3(1).

b. Maximum 5 inches.

c. For engineered rim joists, the manufacturer's recommendations shall govern.

d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).

Reason: This proposal deletes the superscript "b" adjacent to the "2 inches" under the column "ends" and the row "band joist". This footnote states that lag screws and bolts must be within 5 inches of the end of band joists but is incorrect. For the ledger, due to the distribution of load on the ledger, there must be a fastener within 5 inches of the end. But for the band joist, it doesn't matter if a fastener is away from the end. A deck ledger could be fastened completely within one length of band joist material and not near the ends and it doesn't matter. This is most likely just an oversight or typo to begin with.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not affect the cost of construction, because it does not affect the number of fasteners necessary to attach a deck ledger.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal corrected one of the footnotes references in the table. The reference to lag screws and bolts must be within 5 inches of the end of band joists is not correct. The proposal deletes the superscript "b" adjacent to the "2 inches" under the column "ends" and the row "band joist" (10-0).

Final Hearing Results

RB187-22	AS

RB189-22

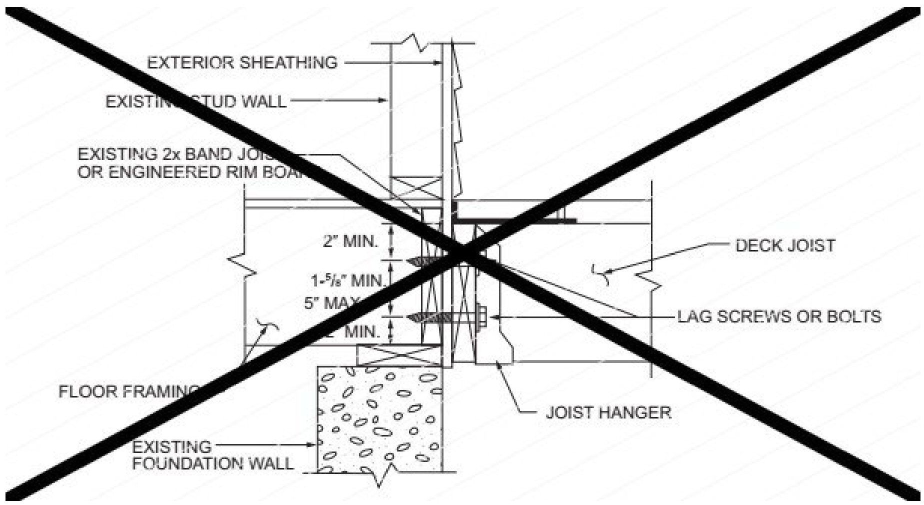
Original Proposal

IRC: FIGURE R507.9.1.3(2), FIGURE R507.9.2(1), FIGURE R507.9.2(2)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Delete and substitute as follows:



~~For SI: 1 inch = 25.4 mm.~~

~~**FIGURE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS**~~

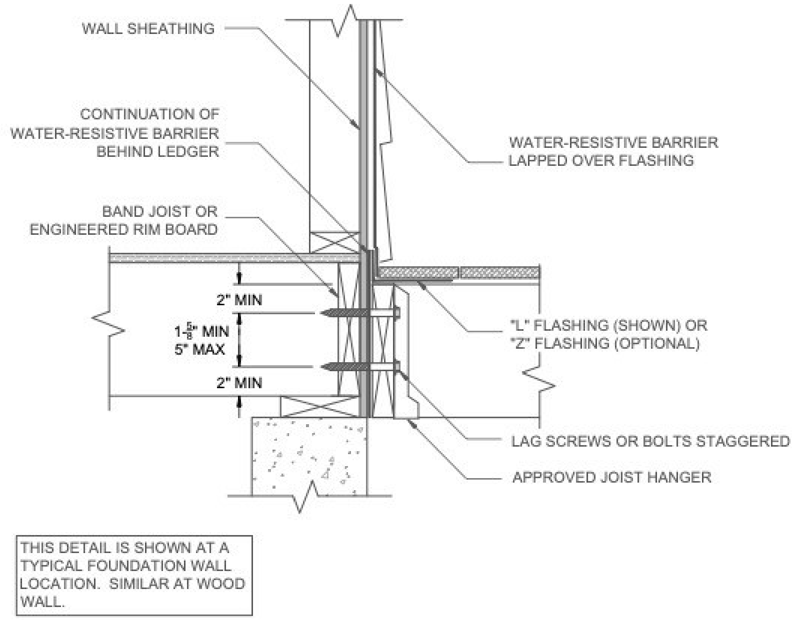
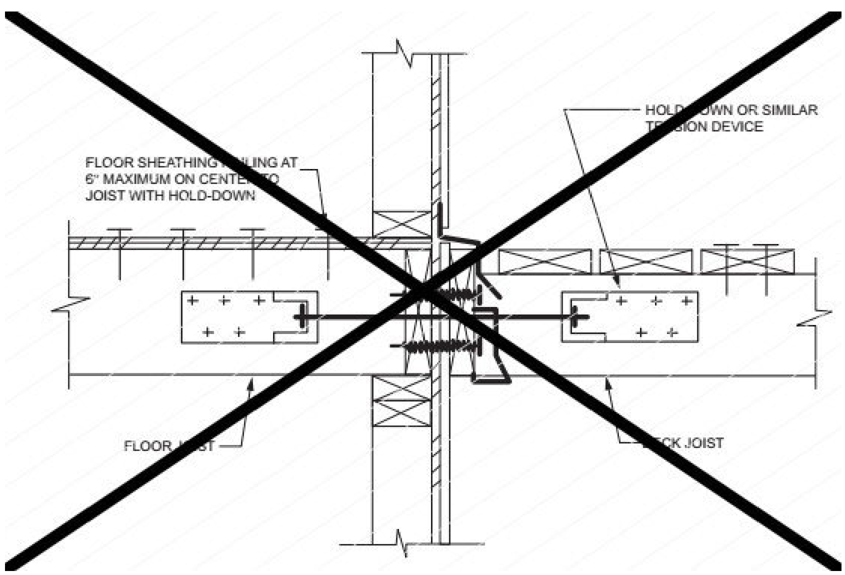


FIGURE R507.9.1.3(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOIST

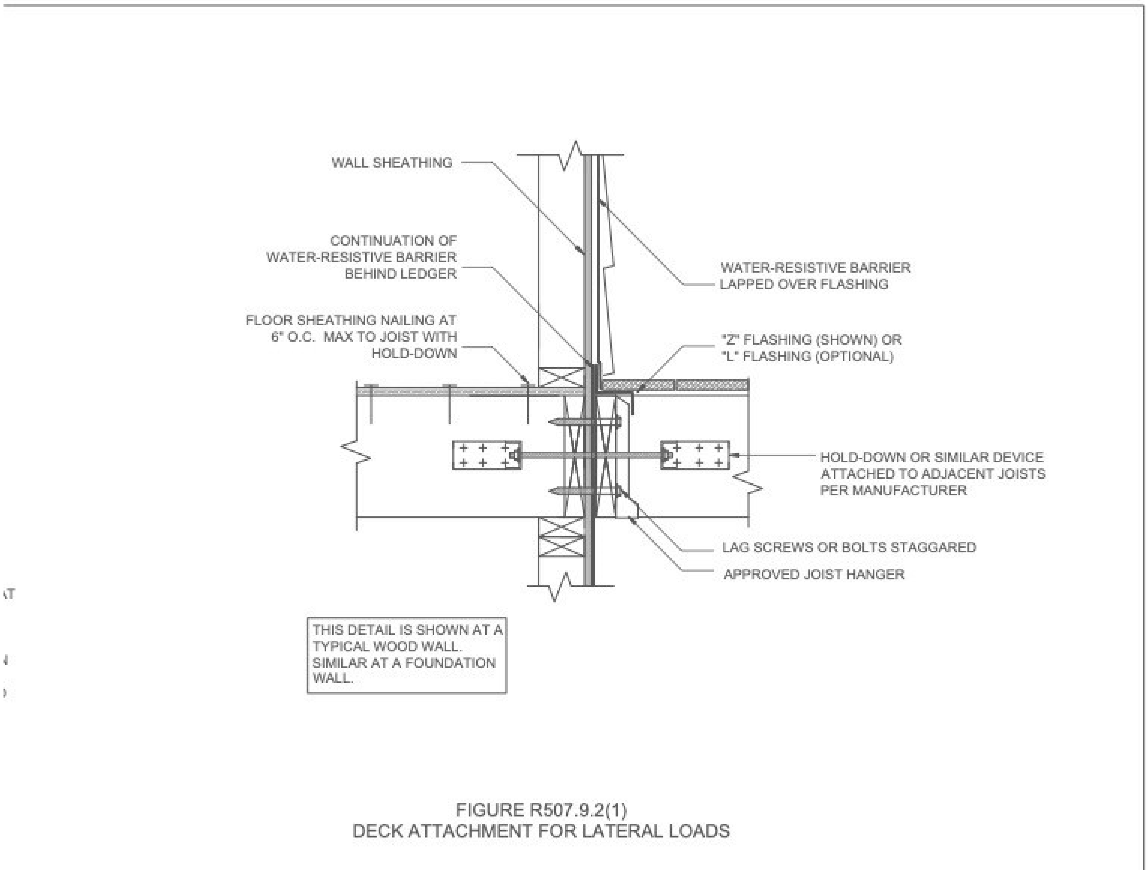
For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS



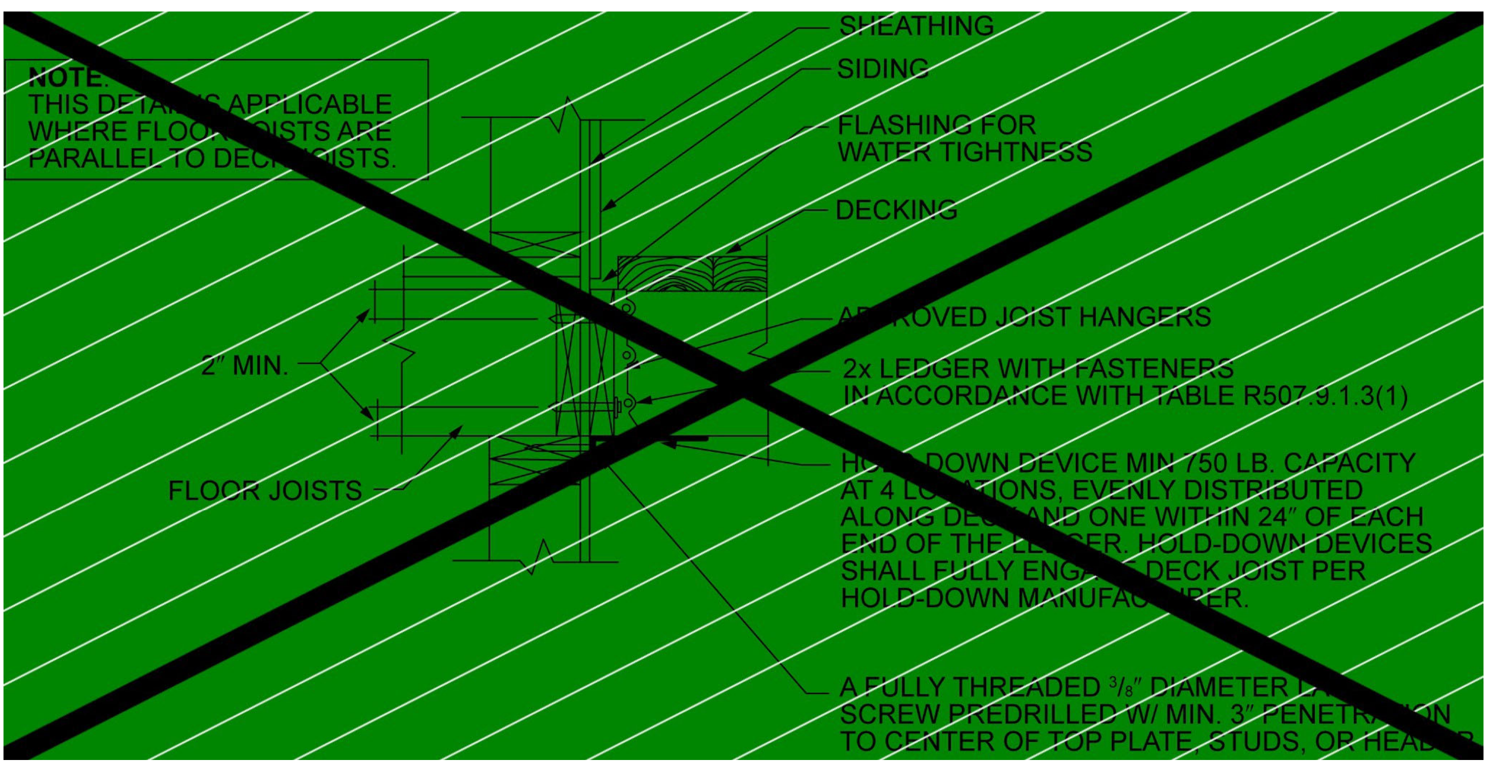
~~For SI: 1 inch = 25.4 mm.~~

~~FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS~~



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS



~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.~~

~~**FIGURE R507.9.2(2) DECK ATTACHMENT FOR LATERAL LOADS**~~

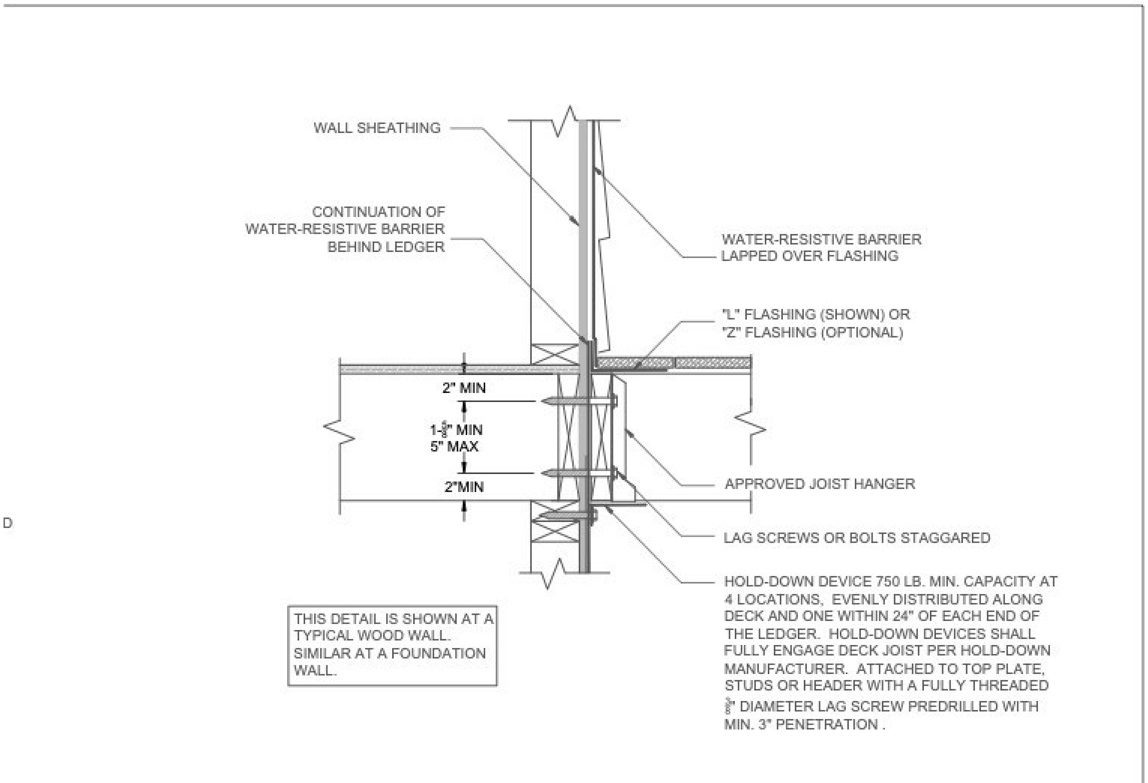


FIGURE R507.9.2(2)
DECK ATTACHMENT FOR LATERAL LOADS

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R507.9.2(2) DECK ATTACHMENT FOR LATERAL LOADS

Reason: Three details related to structural connection of ledgers were included in the IRC from three different proponents over three different editions and differ in their style. As a proud and professional standard, it seemed appropriate for this sixth edition of IRC deck codes to clean these up and bring some consistency.

Notably, the flashing depictions in the original figures varied incredibly and some were not good guidance. The flashing was never the intent of these figures, yet as a graphic, they still sent a confusing and contradictory message to readers.
We have submitted a different proposal that describes new deck ledger flashing methods. Rather than create specific flashing details to support the newly suggested code text, it seemed more efficient to include more appropriate flashing depictions in these structural figures. However, these figures are submitted as a separate proposal for the value of better structural details.

If the flashing proposal is not approved, the flashing details in these figures are still better depictions than the current figures. No structural connection is sufficient if the materials connected prematurely decay. The flashing in these details do contribute to the longevity and reliability of the structural performance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The modifications of this proposal do not affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal adds reasonable details to the figures for placement of lag screws and bolts in band joists and deck attachment for lateral loads. The committee also thought clarifying the continuation of the water-resistive barrier behind the ledger and the water-resistive barrier lapped over flashing were reasonable (Vote: 10-0).

Final Hearing Results

RB189-22	AS

RB190-22

Original Proposal

IRC: R507.2.4, 507.9.1.5 (New), R507.9.1.6 (New), R507.9.1.7 (New), R507.9.1.8 (New), R703.2, R703.4

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R507.2.4 Flashing. Flashing shall be corrosion-resistant metal of nominal thickness not less than 0.019 inch (0.48 mm) or *approved* nonmetallic material that is compatible with the substrate of the structure and the decking materials. Self-adhered membranes used as flashing and counterflashing shall comply with AAMA 711.

Add new text as follows:

507.9.1.5 Ledger Flashing. Where ledgers are attached to wood-frame construction, flashing shall be installed above the ledger to prevent the entry of water into the wall cavity or behind the ledger. Flashing shall extend vertically a minimum of 2 inches (51 mm) above the ledger. Flashing shall extend horizontally a minimum of 4 inches (102 mm) beyond the ledger face or shall extend to the ledger face and a minimum of ¼ inch down the ledger face.

R507.9.1.6 Water-resistive barrier. The *water-resistive* barrier required by Section R703.2 shall be lapped not less than 2 inches (51 mm) over a vertical leg of the ledger flashing or counterflashing extending up the wall. The *water-resistive barrier* shall continue from the top of the ledger flashing down the wall and behind the ledger flashing and ledger.

Exceptions:

1. Flashing shall be permitted to be placed against the face of the water-resistive barrier, where a self-adhering membrane counterflashing is installed a minimum of 2 inches (51 mm) over the vertical leg of the flashing and a minimum of 2 inches (51 mm) onto the water-resistive barrier.
2. Flashing shall be permitted to be placed in front of the water-resistive barrier and behind the cladding where ledgers are spaced horizontally from the exterior wall a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

R507.9.1.7 Existing walls. Where ledgers are attached to existing walls without*water-resistive barriers*, a *water-resistive barrier* shall be installed behind the ledger and ledger flashing. The *water-resistive barrier* shall extend to the top of the ledger flashing vertical leg and a minimum of ½ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed a minimum of 2 inches (51 mm) over the vertical leg of the ledger flashing and a minimum of 2 inches (51 mm) onto the existing sheathing.

R507.9.1.8 Exterior cladding. Exterior cladding shall be terminated above the finished deck surface in accordance with the cladding manufacturer's requirements and Chapter 7, as applicable to the type of cladding.

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of*water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer and behind deck ledgers. 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 R703.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.

2. ASTM E2556, Type 1 or 2.
3. ASTM E331 in accordance with Section R703.1.1.
4. Other approved materials 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).

R703.4 Flashing. *Approved* corrosion-resistant flashing shall be applied*shingle-fashion* in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. <u>Flashing shall be installed above deck ledgers in accordance with Section R507.9.1.5</u>. *Approved* corrosion-resistant flashings shall be installed at the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall be installed in accordance with Section R703.4.1.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood *trim*.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Reason: The sound connection of a deck ledger to a house band joist depends on materials that are free from decay. Ledger flashing is critical to ensuring the band joist of the house floor system does not decay, resulting in a failure of the deck fasteners. The IRC has long required deck ledgers to be flashed when attached to wood construction, but other than requiring they prevent the entry of water, there is no guidance. Deck builders from around the country have learned methods of flashing that are effective in their region and methods that aren't. This proposal attempts to provide more details about the interface between the deck ledger, ledger flashing, water resistive barrier and cladding type, while providing the most flexibility in assembly choice.
The primary goals of this proposal are:

1) Support the variety of flashing methods currently in use.

2) Recognize the different ledger fastening methods in Section 507: Fastened in contact with the sheathing/water-resistive barrier and fastened with 1/2-inch of stacked washer spacing the ledger off the sheathing/water-resistive barrier.

3) Recognize the different cladding materials and types of installations (drainage plane, back-vented)

4) Recognize the higher risk of cutting into an existing water resistive barrier for a deck attachment.

5) Recognize that many houses do not have a water resistive barrier.

6) Protect the house framing when cladding is replaced with a deck ledger.

NOTE: There is a companion, but stand alone, proposal that helps to further clarify the intent of this proposal. Figures R507.9.1.3(2), R507.9.2(2), and R507.9.2(1) depict the structural connection of a ledger but also show an illustrative example of ledger flashing... very poor ones currently. Rather than propose specific, new ledger flashing figures, the flashing in those figures were altered to support the language in this proposal.

COMMENTARY FOR EACH SECTION MODIFICATION:

R703.2 Water-resistive barrier: In this section it is made clear that the water reistive barrier is to continue behind deck ledgers and not terminated on top of them as a "building appendage" as seen in the next sentence in this section.

R703.4 Flashing: A reference to the new sections specifically for deck ledgers is added. Item 5 in the list could not be removed at this time because it includes the terms porches and stairs. There is no harm in item 5 remaining, though future modifications could address this.

The IRC does not do well at distinguishing between a "deck" and "porch" or if there even is a distinction.

R507.2.4 Flashing: A reference to AAMA 711 is included for flashing and counterflashing. This standard is already included in Section R703.4

507.9.1.5 Ledger flashing. This section requires flashing to extend at least 2 inches above the ledger which coincides with standard "shingle fashion" laps required in the water resistive barrier (R703.2). Two common flashing practices are recognized regarding the lower termination of the ledger flashing. An "L" flashing can extend out 4 inches beyond the face of the ledger, which provides added protection to the hardware from moisture. This distance has been found sufficient through practice to sufficiently break the surface tension of water rolling under the flashing such that it drips in front of the ledger. 4 inches was selected to accommodate a 1.5 inch thick ledger spaced 1/2" from the sheathing as provided for in the ledger fastening methods of the IRC. A common "4x6 L flashing" works for this method. Another option provided is for "Z" flashing that turns down the face of the ledger. 1/4 inch was selected as it is the minimum required downward distance of drip edge flashing at the edges of roofs (R905.2.8.5). This vertical leg must be installed between the joist and ledger so it is not bent out horizontally on top of the joist.

R507.9.1.6 Water resistive barrier. The "general" provision is for the barrier to lap a minimum of two inches over the top of the flashing or counterflashing on the wall, regardless of the height of this flashing above the ledger (min 2 inches). In this option, the vertical leg of the ledger flashing must be aligned in a lap in the WRB so that the upper sheet of barrier laps both the flashing and the next sheet by a minimum of 2 inches. The WRB shall be continuous behind the ledger.

R507.9.1.6 Exception 1. Even in new construction of a dwelling, it may be impractical for the WRB lap to be at the ledger flashing location and a deck builder in new or existing construction is understandably reluctant to cut into the barrier. This exception allows for a self-adhering counterflashing to be installed over the flashing and sealed onto the barrier. The counterflashing must be compliant to AAMA 711, per the new reference in R507.2.4 This flashing follows the same minimum 2 inch lap requirements. 4-inch wide rolls of this flashing are a common product on the market.R507.9.1.6 Exception 2. This option allows for when ledgers are spaced off the wall and a drainage plane is behind the ledger. The ledger fastening table allows for up to 1/2 inch of spacers behind the ledger. though, the established minimum space for drainage behind certain cladding in the IRC is only 3/16 inch (R703.7.3.3), due to the critical connection of a ledger and the standardized 1/2 inch standoff, 1/2 inch was chosen as the minimum drainage space. This method is meant to work with vented claddings or back drained claddings held off the wall. In these conditions, the ledger flashing does not need to seal to the water resistive barrier, but rather is placed behind the cladding. Bulk water traveling down the cladding surface is directed by the flashing onto the ledger surface, while bulk water traveling on the surface of the WRB and behind a ledger can freely drain and vent.

R507.9.1.7 Existing walls. Many existing homes do not have a water resistive barrier behind the cladding. These sheathings may be more prone to decay, but they are only supporting cladding. When cladding is removed for a deck ledger attachment, the integrity of the wall framing must now support human occupancy. For this reason, the area behind the ledger and flashing must be covered in a water resistive barrier, just as if there was one above and below. Since there is no existing WRB to connect to, the barrier installed behind the ledger must extend at least 1/2 inch beyond the sides and bottom of the deck. This allows a deck addition to be installed with a cut to the existing cladding at the ends of the ledger that does not require the cladding be cut back further than 1/2 inch. This is a balance between assuring the barrier extends completely behind the ledger, but with minimal repair required to existing cladding. Above the ledger, a self adhering counterflashing is used to seal over the ledger flashing and the barrier behind the flashing to the existing exposed sheathing.

R507.9.1.8 Cladding. This is a reminder that different cladding types require different clearances to the finished deck surface. This is something very overlooked in the deck and code administration industry.

Cost Impact: The code change proposal will increase the cost of construction
This code change will have a different cost increase depending on many variables, including the size of the deck and the existing conditions. This proposal allows various options to meet minimum code and they have different costs associated. A few examples are provided in this cost impact statement. All product cost estimates were found through online retailers.

1) For new construction, these practices may already be taking place. New material costs from this proposal could be from lacing the flashing into the water-resistive barrier or sealing it to the surface. The self adhered flashing tape was found for approximately $20 for a 50 ft. roll and a 140 ft roll of #30 asphalt paper for $100. Another search for a larger bulk purchase resulted in a 216 ft. roll of #30 paper for $23. The material costs for this method are less than $0.50 per linear foot.

2) For deck additions, the addition of a water resistive barrier behind the ledger and the self adhering tape over the ledger flashing would include both products in the first example. This is approximately $1.0 per linear foot of ledger in additional material costs. This is a conservatively high estimate.

The labor costs associated with this modification to current ledger flashing installation practices is minimal. Paper is cut and installed before installing the ledger and self adhering tape is installed over the flashing. This is the added labor.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal provides good guidance and further improves deck safety requirements (Vote: 7-3).

Public Comments

Public Comment 1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, North American Deck and Railing Association (glenn@glennmathewson.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

507.9.1.5 Ledger Flashing. Where ledgers are attached to wood-frame construction, flashing shall be installed above the ledger to prevent the entry of water into the wall cavity or behind the ledger. Flashing shall extend vertically a minimum of 2 inches (51 mm) above the ledger. Flashing shall extend horizontally a minimum of 4 inches (102 mm) beyond the ledger face or shall extend to the ledger face and a minimum of ¼ inch down the ledger face.

Exceptions:

1. Where a window or door opening is located less than 2 inches above the ledger, flashing shall extend to the bottom of the wall opening.
2. Flashing is not required where the ledger is spaced horizontally from the *exterior wall covering* a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

R507.9.1.6 Water-resistive barrier. The *water-resistive* barrier required by Section R703.2 shall be lapped ~~not less than 2 inches (51 mm~~) over a vertical leg of the ledger flashing or counterflashing extending up the wall by not less than 2 inches (51 mm) or the height of the vertical flashing leg, whichever is less. The *water-resistive barrier* shall continue from the top of the ledger flashing down the wall and behind the ledger flashing and ledger.

Exceptions:

1. Flashing shall be permitted to be placed against the face of the water-resistive barrier, where a self-adhering membrane counterflashing is installed a minimum of 2 inches (51 mm) over the vertical leg of the flashing and a minimum of 2 inches (51 mm) onto the water-resistive barrier.
2. Flashing shall be permitted to be placed in front of the water-resistive barrier and behind the ~~cladding~~ *exterior wall covering* where ledgers are spaced horizontally from the exterior wall a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

R507.9.1.7 Existing walls. Where ledgers are attached to existing walls without *water-resistive barriers*, a *water-resistive barrier* shall be installed behind the ledger and ledger flashing. The *water-resistive barrier* shall extend to the top of the ledger flashing vertical leg and a minimum of ½ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed a minimum of 2 inches (51 mm) over the vertical leg of the ledger flashing and a minimum of 2 inches (51 mm) onto the existing sheathing.

Exceptions:

1. Where a window or door opening is located less than 2 inches (51 mm) above the ledger, flashing shall extend to the bottom of the wall opening.
2. Flashing is not required where the ledger is spaced horizontally from the *exterior wall covering* a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

R507.9.1.8 Exterior ~~cladding~~ wall covering. ~~Exterior cladding~~*Exterior wall coverings* shall be terminated above the finished deck surface in accordance with the ~~cladding~~ covering manufacturer's requirements and Chapter 7, as applicable to the type ofcovering ~~cladding~~.

Exception: *Exterior wall coverings* shall be permitted behind ledgers in accordance with Section R507.9.1.5 where capable of resisting compression forces from the ledger attachment

Commenter's Reason: We have continued to work on this proposals with others to fine tune it. We received concerns from the NAHB about the vertical height of flashing when a window or door opening is located above. We have addressed this with new exceptions.

To address this in Section R507.9.1.6 Water-resistive barrier, we made a small change. It's important to recognize that self-adhering membranes can still be water-resistive barriers by IRC definition, so when the flashing is cut to fit below an opening in the wall, the requirement for the water-resistive barrier can be satisfied by a self-adhering membrane and integrated into the sill flashing methods at the bottom of the opening.
We also added exceptions to address conditions where a ledger can be spaced from the face of the final exterior wall covering and no flashing is required at all.

We also recognized that the term "exterior wall covering" is not only defined in chapter 2, but it is the most generic term used in chapter 7. We felt it was a more appropriate term than "cladding".

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
This public comment modification will not increase or decrease the cost of construction. This PC does not change the intent of the original proposal. Instead, it provides some additional details for certain flashing applications that were not prescriptively captured in the original proposal.

Final Hearing Results

RB190-22	AMPC1

RB192-22

Original Proposal

IRC: TABLE R602.3(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 Residential Code

Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS	
			Edges[h] (inches)	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panelexterior wall sheathing to wall framing]				
31	3/8″ – 1/2″	6d common or deformed (2″ × 0.113″ × 0.266″ head);2 3/8″ × 0.113″ × 0.266″ head nail (subfloor, wall)[i]	6	12 ~~6~~[f]
		8d common (2 1/2″ × 0.131″) nail (roof); or RSRS-01 (2 3/8″ × 0.113″) nail (roof)[b]	6[f]	6[f]
32	19/32" - 3/4″	8d common (2-2 1/2″ × 0.131″) nail (subfloor, wall)	6	12
		8d common (2 1/2″ × 0.131″) nail (roof); or RSRS-01; (2 3/8″ × 0.113″) nail (roof)[b]	6[f]	6[f]
		Deformed 2 3/8″ × 0.113″ × 0.266″ head (wall or subfloor)	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.11.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. 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.

g. Gypsum sheathing shall conform to ASTM C1396 and shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Reason: This proposal places footnote f on edge spacing values for roof sheathing fastening to be consistent with the original change proposal (RB196-16) and the 2018 Wood Frame Construction Manual. The occurrence of footnote f to modify (subfloor, wall) spacing of 6 inches at intermediate supports is removed because footnote f applies to roof sheathing fastening, and the 6 inch value is revised to 12 inch as a correction given the entry is for subfloor and wall applications. An extra "2-" is proposed for editorial removal in the first row of item 32.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The changes are clarifications for roof sheathing attachment consistent with the original change (RB196-19) and the 2018 Wood Frame Construction Manual and corrections to footnote locations and fastener spacing at intermediate supports for subfloor and wall applications.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approval is based on the proposal correcting the use of the footnote f in Table R602.3(1) for the fastening schedule. The committee also agreed with editorially removing the extra "2-" in the first row of item 32 and revising the 6-inch value to 12 inches based on the entry for subfloor and wall applications (Vote: 10-0).

Final Hearing Results

RB192-22	AS

RB193-22

Original Proposal

IRC: TABLE R602.3(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 Residential Code

Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS	
			Edges[h] (inches)	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panelexterior wall sheathing to wall framing]				
31	$^{3}/_{8}$″ – $^{1}/_{2}$″	6d common or deformed (2″ × 0.113″ × 0.266″ head);2$^{3}/_{8}$″ × 0.113″ × 0.266″ head nail (subfloor, wall)[i]	6	6[f]
		8d common (2$^{1}/_{2}$″ × 0.131″<u>× 0.281″ head</u>) nail (roof); or RSRS-01 (2$^{3}/_{8}$″ × 0.113″<u>× 0.281″ head</u>) nail (roof)[b]	6	6[f]
32	$^{19}/_{32}$" - $^{3}/_{4}$″	8d common (2-2$^{1}/_{2}$″ × 0.131″) nail (subfloor, wall)	6	12
		8d common (2$^{1}/_{2}$″ × 0.131″<u>× 0.281″ head</u>) nail (roof); or RSRS-01; (2$^{3}/_{8}$″ × 0.113″<u>× 0.281″ head</u>) nail (roof)[b]	6	6[f]
		Deformed 2$^{3}/_{8}$″ × 0.113″ × 0.266″ head (wall or subfloor)	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.11.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. 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. <u>Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed in accordance with 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.</u>

g. Gypsum sheathing shall conform to ASTM C1396 and shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Reason: Fastening of roof sheathing to resist wind uplift forces is based on wood framing of species with specific gravity equal to 0.42 (per proposal RB196-19). To address possible applications using lower specific gravity wood species for 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 species used for roof 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, 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. The added language for permissible use of engineered design for fastener spacing greater than 6 inches on center at intermediate supports may reduce amount of required nailing such as in lower wind speed zones.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee disapproved this proposal based on the fact that the proposal requires engineering design while the IRC includes prescriptive provisions. In addition, the committee was concerned that the new text for specific gravity of the wood species used for roof framing is greater than or equal to 0.35 but less than 0.42 to be verified on site, which is not practical. This issue of specific gravity can be addressed by grade stamp. The committee also recommended adding a chart and taking out the engineering design requirements during the public comment phase (Vote: 7-3).

Public Comments

Public Comment 1

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council (pline@awc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS	
			Edges[h] (inches)	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panelexterior wall sheathing to wall framing]				
31	$^{3}/_{8}$″ – $^{1}/_{2}$″	6d common or deformed (2″ × 0.113″ × 0.266″ head);2$^{3}/_{8}$″ × 0.113″ × 0.266″ head nail (subfloor, wall)[i]	6	6[f]
		8d common (2$^{1}/_{2}$″ × 0.131″× 0.281″ head) nail (roof); or RSRS-01 (2$^{3}/_{8}$″ × 0.113″× 0.281″ head) nail (roof)[b]	6	6[f]
32	$^{19}/_{32}$" - $^{3}/_{4}$″	8d common (2-2$^{1}/_{2}$″ × 0.131″) nail (subfloor, wall)	6	12
		8d common (2$^{1}/_{2}$″ × 0.131″× 0.281″ head) nail (roof); or RSRS-01; (2$^{3}/_{8}$″ × 0.113″× 0.281″ head) nail (roof)[b]	6	6[f]
		Deformed 2$^{3}/_{8}$″ × 0.113″ × 0.266″ head (wall or subfloor)	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

f. 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 in accordance with AWC NDS.~~ Fastener spacing applies where roof framing specific gravity is 0.42 or larger. ~~Where the specific gravity of the wood species used for~~Where roof framing specific gravity 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~~.

Commenter's Reason: The change proposal as well as the public comment addresses the use of roof framing having lower specific gravity than 0.42 associated with prescribed spacing of nails. The modifications to the original proposal address committee comments to focus on a simple prescriptive option because alternative fastening per an engineered design is already addressed through existing provisions of the IRC (i.e., R301.1.3). Accordingly, footnote f has been revised to identify the 0.42 specific gravity basis of the existing spacing requirements (based on lesser withdrawal strength performance of smooth shank common nails) and to prescribe the RSRS-03 ring shank nail option at the same spacing where roof framing specific gravity is less than 0.42 but greater than or equal to 0.35.
While specific gravity is the primary wood property for nail withdrawal strength per an engineered design, existing specific gravity triggers in the IRC are limited to less common applications than wood structural panel roof sheathing attachment to roof framing. To support the added fastening option for low specific gravity roof framing, AWC is developing FAQ's and web-based materials to assist with identification of lumber specific gravity from the grade mark. For reference, the four major lumber species/species combinations for which prescriptive span tables are provided in the IRC and their assigned specific gravity per NDS are tabulated below (all have specific gravity of at least 0.42). A full listing of specific gravity for lumber species/species combinations is available in the National Design Specification (NDS) for Wood Construction and its Supplement.

Lumber species/species combination and specific gravity (G)
Southern pine (G=0.55)
Douglas fir-larch (G=0.50)
Hem-fir (G=0.43)
Spruce-pine-fir (G=0.42)

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
Increased cost for fastening roof sheathing will occur where low specific gravity wood species are used (i.e., specific gravity less than 0.42). For wood species with specific gravity less than 0.42 but greater than or equal to 0.35, the ring shank nail option provides equivalent withdrawal performance to the 0.42 specific gravity and smooth nail basis of the existing fastening schedule without requiring engineered design. In areas where typical practice is to specify and use material with specific gravity of 0.42 or greater for roof framing, there is no increased cost of construction associated with this change proposal. Where engineered design for fastener spacing per R301.1.3 is employed as a typical practice, an increase in field nail spacing and reduction in fastening costs is viable for closer than 24” o.c. rafter spacing and in lower wind speed zones.

Final Hearing Results

RB193-22	AMPC1

RB194-22

Original Proposal

IRC: TABLE R602.3(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 Residential Code

Revise as follows:

TABLE R602.3(2) ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

Portions of table not shown remain unchanged.

NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION[a, b] OF FASTENER AND LENGTH (inches)	SPACING[c] OF FASTENERS	
		Edges (inches)	Intermediate supports (inches)
Wood structural panels subfloor, roof[g] and wall sheathing to framing and particleboard wall sheathing to framing[i]			
Up to $^{1}/_{2}$	Staple 15 ga. $1^{3}/_{4}$	4	8
	0.097-0.099 Nail $2^{1}/_{4}$	3	6
	Staple 16 ga. $1^{3}/_{4}$	3	6
$^{19}/_{32}$ and $^{5}/_{8}$	0.113 Nail 2	3	6
	Staple 15 and 16 ga. 2	4	8
	0.097-0.099 Nail $2^{1}/_{4}$	4	8
$^{23}/_{32}$ and $^{3}/_{4}$	Staple 14 ga. 2	4	8
	Staple 15 ga. $1^{3}/_{4}$	3	6
	0.097-0.099 Nail $2^{1}/_{4}$	4	8
	Staple 16 ga. 2	4	8
1	Staple 14 ga. $2^{1}/_{4}$	4	8
	0.113 Nail $2^{1}/_{4}$	3	6
	Staple 15 ga. $2^{1}/_{4}$	4	8
	0.097-0.099 Nail $2^{1}/_{2}$	4	8

For SI: 1 inch = 25.4 mm.

a. Nail is a general description and shall be permitted to be T-head, modified round head or round head.

b. Staples shall have a minimum crown width of $^{7}/_{16}$-inch except as noted.

c. Nails or staples shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater. Nails or staples shall be spaced at not more than 12 inches on center at intermediate supports for floors.

d. Fasteners shall be placed in a grid pattern throughout the body of the panel.

e. For 5-ply panels, intermediate nails shall be spaced not more than 12 inches on center each way.

f. Hardboard underlayment shall conform to CPA/ANSI A135.4.

g. Alternate fastening is only permitted for roof sheathing where the ultimate design wind speed is less than or equal to 110 mph, and where fasteners are installed 3 inches on center at all supports, 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.

h. Fiber-cement underlayment shall conform to ASTM C1288 or ISO 8336, Category C.

Reason: Fastening of roof sheathing to resist wind uplift forces is based on wood framing of a species with specific gravity equal to 0.42 (per proposal RB198-19). To address possible applications using species with lower specific gravity, the footnote is expanded to limit applicability to wood framing species with specific gravity equal to 0.42 or greater. Lack of design information in AWC NDS on staple withdrawal is why a lower specific gravity option is not prescribed for staples as part of this change. Prescriptive options for fastening with nails in wood with specific gravity of 0.35 or greater are proposed for Table R602.3(1) and include an option for design of reduced fastener spacing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the specific gravity limit for the prescribed alternative fastening. Prescriptive fastening options for wood species of lower specific gravity are proposed for inclusion in Table R602.3(1).

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee decided that the proposal clarifies for the code users that where fastening to the wood framing of a species with a specific gravity greater than or equal to 0.42, then AWC NDS could be used. The proposal also does not require engineering design. Therefore, the committee prefers this proposal to the approach in RB 193-22 (Vote: 7-3).

Final Hearing Results

RB194-22	AS

RB195-22

Original Proposal

IRC: TABLE R602.3(3)

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 Residential Code

Revise as follows:

TABLE R602.3(3) REQUIREMENTS 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		ULTIMATE DESIGN WIND SPEED V_{ult} (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[d]	140	115	110
8d Common (2.5″ × 0.131″)	1.75	24/16	$^7/_{16}$	16	6	12[d]	170	140	135
				24	6	12[d]	140	115	110

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. Panel strength axis 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. Table is based on wind pressures acting toward and away from building surfaces in accordance with Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.

c. Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternate to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 o.c. shall be used with studs spaced not more than 16 inches on center.

d. 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, maximum nail spacing in the field of the panel shall be 8 inches. 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: The change addresses the use of wall framing of wood species having lower specific gravity wall framing than the value of 0.42 associated with prescribed spacing of nails in the field of the panel. Footnote 2 is added to reduce maximum spacing permissible when species with low specific gravity are used. The resulting maximum nail spacing of 8 inch results from 2/3 of the prescribed 12 inch spacing to account for reduced withdrawal capacity of wall framing of species with low specific gravity. 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 **Disapproved**

Committee Reason: The committee disapproved this proposal due to the fact that the requirements in the current code are not based on the specific gravity of 0.42. The committee has an issue with the proposal requiring engineering design while the IRC is a prescriptive code (Vote: 7-3).

Public Comments

Public Comment 1

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council (pline@awc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

Portions of table not shown remain unchanged.

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		ULTIMATE DESIGN WIND SPEED V_{ult} (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[d]	140	115	110
8d Common (2.5″ × 0.131″)	1.75	24/16	$^7/_{16}$	16	6	12[d]	170	140	135
				24	6	12[d]	140	115	110

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

d. Fastener spacing applies where wall framing specific gravity is 0.42 or larger.Where ~~the specific gravity of the wood species used for~~ wall framing specific gravity is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, maximum nail spacing in the field of the panel shall be 8 inches. ~~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.~~

Commenter's Reason: The change proposal as well as the public comment addresses the use of wall framing having lower specific gravity than the value of 0.42 associated with prescribed spacing of nails. The modifications to the original proposal address committee comments to focus on a simple prescriptive option because alternative fastening per an engineered design can be addressed through existing provisions of the IRC (i.e., R301.1.3). Accordingly, Footnote d has been revised to identify the 0.42 specific gravity basis of the existing spacing requirements and further prescribe that 8 inch on center field nail spacing is required instead of 12 inch on center where wall framing specific gravity is less than 0.42 but greater than or equal to 0.35. Reduced wind suction pressures on walls when compared to roofs, enables an option for reduced spacing of the prescribed smooth shank nail to compensate for reduced withdrawal capacity of low specific gravity framing.

While specific gravity is the primary wood property for nail withdrawal strength per an engineered design, existing specific gravity triggers in the IRC are limited to less common applications than wood structural panel wall sheathing attachment to wall framing. To support the added fastening option for low specific gravity wall framing, AWC is developing FAQ's and web-based materials to assist with identification of lumber specific gravity from the grade mark. For reference, the four major lumber species/species combinations for which span tables are provided in the IRC and their assigned specific gravity per NDS are tabulated below (all have specific gravity of at least 0.42). A full listing of specific gravity for lumber species/species combinations is available in the National Design Specification (NDS) for Wood Construction and its Supplement.

Lumber species/species combination and specific gravity (G)
Southern pine (G=0.55)
Douglas fir-larch (G=0.50)
Hem-fir (G=0.43)

Spruce-pine-fir (G=0.42)

Cost Impact: The net effect of the Public Comment and 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 provides equivalent withdrawal performance to the 0.42 specific gravity basis of the existing fastening schedule without requiring engineered design. In areas where typical practice is to specify and use material with specific gravity of 0.42 or greater for wall framing, there is no increased cost of construction associated with this change proposal. Where engineered design for fastener spacing per R301.1.3 is employed as a typical practice, use of field nail spacing of 12” on center and no increase in fastening costs is viable for closer than prescribed stud spacings and for lower wind speeds than tabulated.

Final Hearing Results

RB195-22	AMPC1

RB197-22

Original Proposal

IRC: R602.7.2

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R602.7.2 Rim board headers. Rim board header size, material and span shall be in accordance with Table R602.7(1). Rim board headers shall be constructed in accordance with Figure R602.7.2 and shall be supported at each end by full-height studs. The number of full-height studs at each end shall be not less than <u>one plus</u> the number of studs displaced by half of the header span based on the maximum stud spacing in accordance with Table R602.3(5). Rim board headers supporting concentrated loads shall be designed in accordance with accepted engineering practice.

Reason: The reason for this change is to correct the number of full-height studs required at the edge of openings using rim board headers. The code currently says that the number of full-height studs needs to be half the number of studs displaced by the opening. But that neglects the single stud that is already required to be at the edge of the opening. The total number of full height studs needs to be the one already at the opening edge, PLUS half the number of studs displaced by the opening. This is actually shown correctly in Figure R602.7.2. It shows two studs at each end of the opening. Note that there are two cripple studs in the opening, so half that number would go to each side of the opening. Using the existing text, only one stud would be required at each edge of the opening. But the number needs to be one (existing stud) PLUS one (half the number of studs displaced), or two total at each edge.

Cost Impact: The code change proposal will increase the cost of construction
This proposal could increase the cost of construction by requiring an additional stud at the edge of each opening using rim board headers. However, I think that what is contained in this change is common practice so there may not be any actual increase in cost. The extra cost is balanced by the safety of having adequate bearing for the rim board header and adequate out of plane wind load resistance by the wall.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee determined that the proposal clarifies the code intent by adding " one plus" in section R602.7.2. Accordingly, the number of full-height studs at each end shall be not less than one plus the number of studs displaced by half of the header span based on the maximum stud spacing (Vote: 8-2).

Final Hearing Results

RB197-22	AS

RB199-22

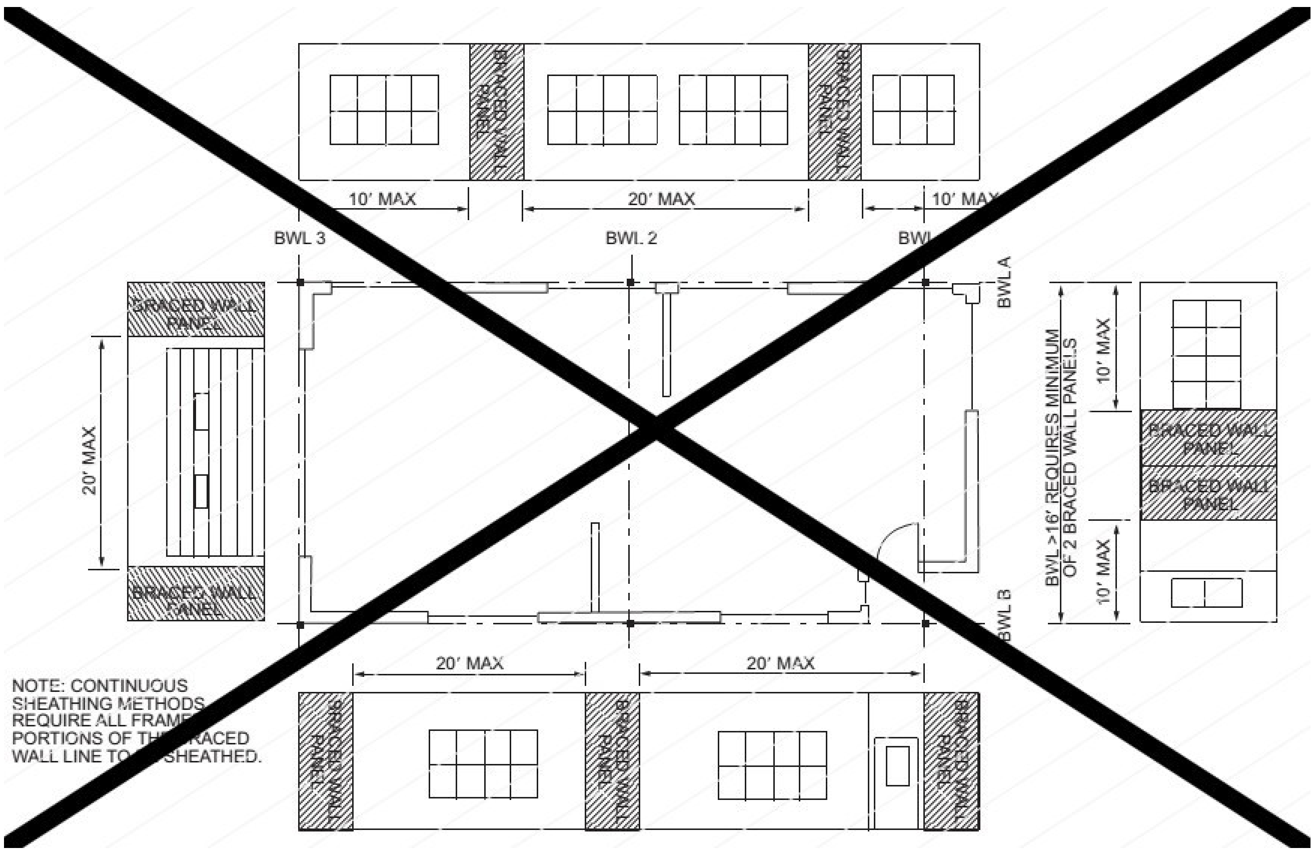
Original Proposal

IRC: FIGURE R602.10.2.2

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

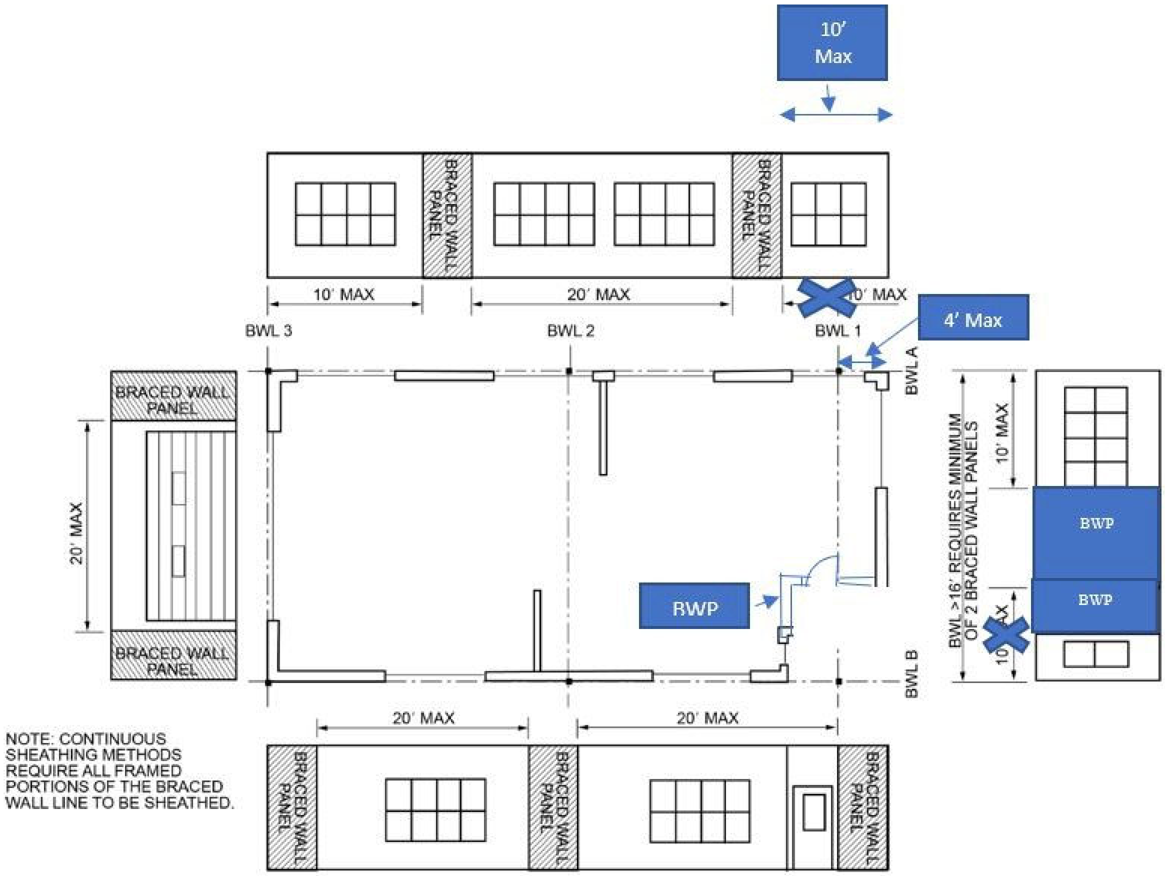
2021 International Residential Code

Delete and substitute as follows:



~~For SI: 1 foot = 304.8 mm.~~

~~**FIGURE R602.10.2.2 LOCATION OF BRACED WALL PANELS**~~



For SI: 1 foot = 304.8 mm.

FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS

For SI: 1 foot = 304.8
mm.

FIGURE R602.10.2.2 LOCATION OF BRACED WALL PANELS

Reason: Figure R602.10.2.2 is no longer accurate with the change to BWL placement in IRC 2021 Section R602.10.1.2. This proposal corrects two graphical inaccuracies in Figure R602.10.2.2:

1. The 10' dimension along BWL A between the top right corner and BWL 1. Per R602.10.1.1, the 10' should be measured from the perpendicular wall at the end of the BWL, not the perpendicular BWL centerline. <= We found this while looking closely at the figure

2. BWL 1 was improperly shown with all panels on one side of BWL 1. Per R602.10.1.2, no more than 2/3 of the required braced wall panel length is allowed to be located on one side of the BWL. <= this was the 2021 change

3. In addition, the existing pair of side-by-side braced wall panels along BWL 1 were combined into one large braced wall panel. This was done to emphasize the requirement in Section R602.10.2.3 that a braced wall line greater than 16 feet in length must be provided with a minimum of two braced wall panels, regardless of the size of those panels. This change also eliminates the misconception that installation of 2 braced wall panels side-by-side in a > 16-foot BWL provides equal performance to having the 2 braced wall panels spaced further apart. Installation of side-by-side braced wall panels runs counter to the function and purpose of requiring a minimum of 2 braced wall panels in the longer BWLs.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

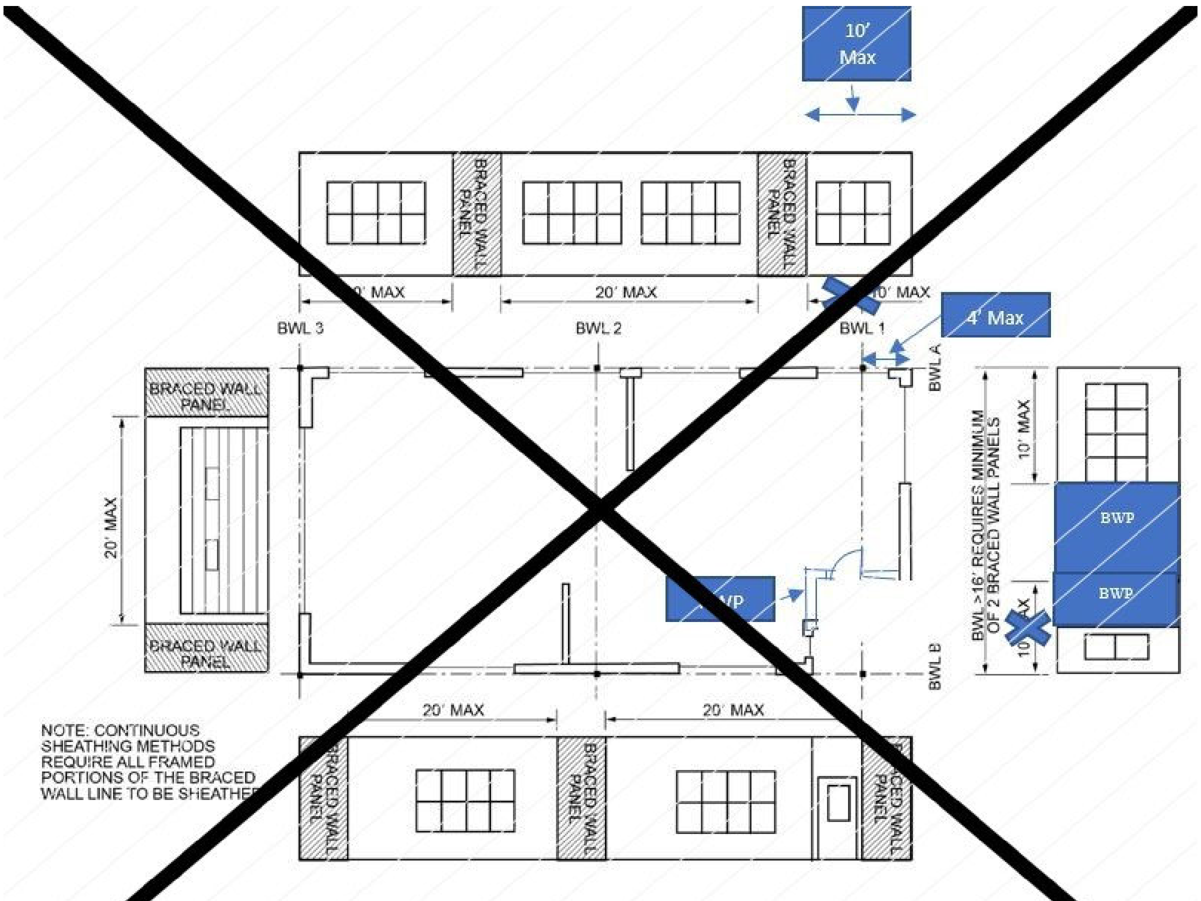
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group 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 clarification change only; the intent is to update Figure R602.10.2.2 to match the updated requirements in IRC 2021 Section R602.10.1.2.

Public Hearing Results

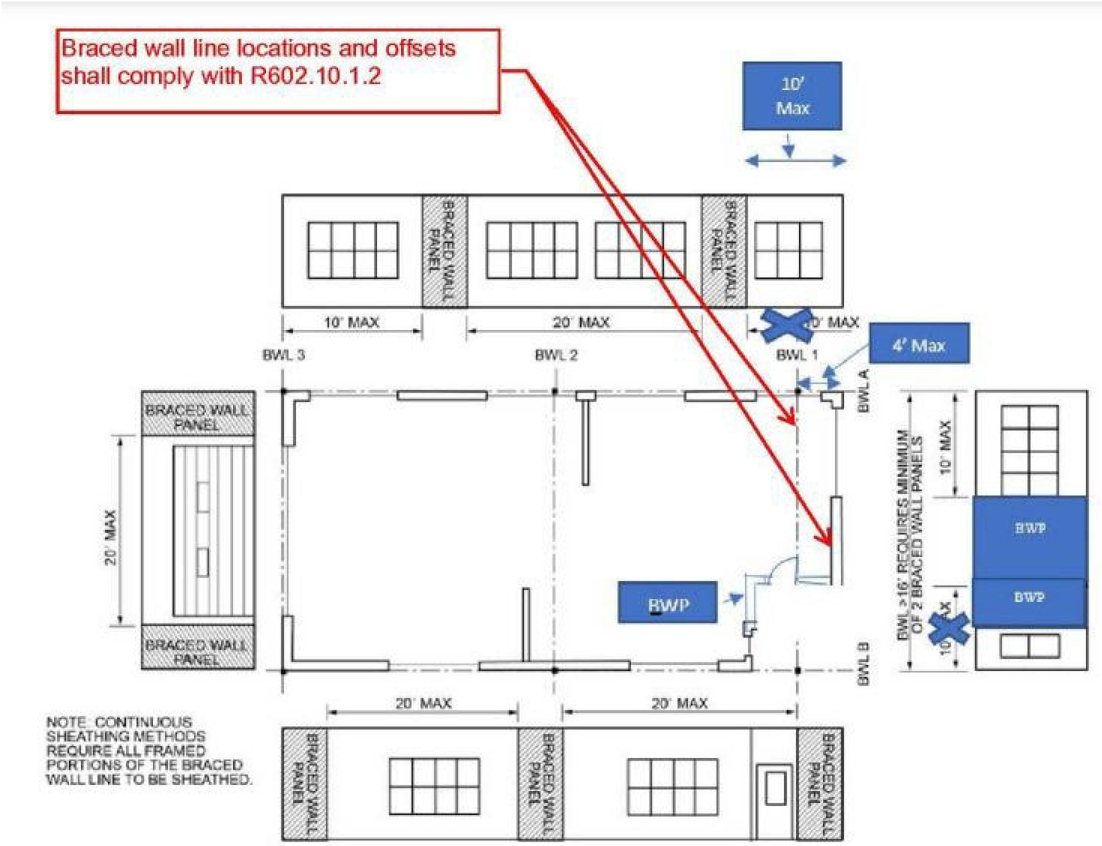
Committee Action **As Modified**

Committee Modification:



For SI: 1 foot = 304.8 mm.

FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS



For SI: 1 foot = 304.8 mm.

FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS

Committee Reason: The committee concluded that the modification clarifies the reference of the locations and offsets for braced walls. The committee determined that the proposal as modified fixes the inaccuracies in Figure R602.10.2.2. In addition, The proposal correlates Figure R602.10.2.2 with the change to BWL placement in IRC 2021 Section R602.10.1.2 (Vote: 10-0).

Final Hearing Results

RB199-22	AM

RB200-22

Original Proposal

IRC: R602.10.2.2, TABLE R602.10.5, R602.10.6

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

R602.10.2.2 Locations of braced wall panels. ~~A~~ The nearest edge of a *braced wall panel* shall ~~begin~~ be located within 10 feet (3810 mm) from each end of a *braced wall line* as determined in Section R602.10.1.1. The distance between adjacent edges of braced wall panels along a *braced wall line* shall be not greater than 20 feet (6096 mm) as shown in Figure R602.10.2.2.

Exceptions:

1. Braced wall panels in *Seismic Design Categories* D_0, D_1 and D_2 shall comply with Section R602.10.2.2.1.
2. Braced wall panels with continuous sheathing in *Seismic Design Categories* A, B or C shall comply with Section R602.10.7.

TABLE R602.10.5 MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		MINIMUM LENGTH[a] (inches) Wall Height 8 feet	9 feet	10 feet	11 feet	12 feet	CONTRIBUTING LENGTH (inches)
DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP		48	48	48	53	58	Actual[b]
GB		48	48	48	53	58	Double sided = ActualSingle sided = 0.5 × Actual
LIB		55	62	69	NP	NP	Actual[b]
ABW	SDC A, B and C, ultimate design wind speed < 140 mph	28	32	34	38	42	48
	SDC D_0, D_1 and D_2, ultimate design wind speed < 140 mph	32	32	34	NP	NP	
CS-G		24	27	30	33	36	Actual[b]
CS-WSP, CS-SFB	Adjacent clear opening height (inches)						
	≤ 64	24	27	30	33	36	Actual[b]
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100	—	44	40	38	38	
	104	—	49	43	40	39	
	108	—	54	46	43	41	
	112	—	—	50	45	43	
	116	—	—	55	48	45	
	120	—	—	60	52	48	
	124	—	—	—	56	51	
	128	—	—	—	61	54	
	132	—	—	—	66	58	
	136	—	—	—	—	62	
	140	—	—	—	—	66	
	144	—	—	—	—	72	
METHOD (See Table R602.10.4)		Portal header height					
		8 feet	9 feet	10 feet	11 feet	12 feet	
PFH	Supporting roof only	16	16	16	Note c	Note c	48
	Supporting one story and roof	24	24	24	Note c	Note c	
PFG		24	27	30	Note d	Note d	1.5 × Actual[b]
CS-PF	SDC A, B and C	16	18	20	Note e	Note e	1.5 × Actual[b]
	SDC D_0, D_1 and D_2	16	18	20	Note e	Note e	Actual[b]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

NP = Not Permitted.

a. Linear interpolation shall be permitted.

b. Use the actual length where it is greater than or equal to the minimum length. <u>The actual length of Methods CS-G, CS-WSP, CS-SFB, PFH, PFG, and CS-PF is the length of the full-height sheathed section.</u>

c. Maximum header height for PFH is 10 feet in accordance with Figure R602.10.6.2, but wall height shall be permitted to be increased to 12 feet with pony wall.

d. Maximum header height for PFG is 10 feet in accordance with Figure R602.10.6.3, but wall height shall be permitted to be increased to 12 feet with pony wall.

e. Maximum header height for CS-PF is 10 feet in accordance with Figure R602.10.6.4, but wall height shall be permitted to be increased to 12 feet with pony wall.

R602.10.6 Construction of Methods ABW, PFH, PFG, CS-PF and BV-WSP. Methods ABW, PFH, PFG, CS-PF and BV-WSP shall be constructed as specified in Sections R602.10.6.1 through R602.10.6.5. <u>For the purposes of determining braced wall panel spacing, the edge of Methods PFH, PFG, and CS-PF shall be defined as the end of the header.</u>

Reason: There has been confusion by users on where to locate the edge of a single portal frame when applying the braced wall panel spacing rules in R602.10.2.2. There is disagreement whether the spacing should be measured from the vertical sheathed portal located at one end, or the end of the header. Since the full length of the header is taking shear loads out of the top plate, and the purpose of the braced wall panel spacing requirements is to ensure that excessive load does not accumulate in the top plate, it makes sense that the edge of the portal is the end of the header.
Since the term “edge” is now being used for portals, Section R602.10.2.2 should be revised to be consistent and use the term “edge” instead of saying “begin”. Note b in Table R602.10.5 is amended to clarify that the “actual length” is the length of the vertical sheathed portion of a portal frame. If the edges are defined as the ends of the header, that might lead to confusion on what is the “actual length” of the portal frame. The minimum length is indicated in the Figures so it does not need clarification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will definitely not increase the cost of construction. It could decrease the cost of construction if a user was interpreting the code to say that the edge of a portal frame is measured from the sheathing edge. That would require a closer spacing of braced wall panels than necessary using the new proposed interpretation.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R602.10.6 Construction of Methods ABW, PFH, PFG, CS-PF and BV-WSP. Methods ABW, PFH, PFG, CS-PF and BV-WSP shall be constructed as specified in Sections R602.10.6.1 through R602.10.6.5. For the purposes of determining braced wall panel spacing<u> and end distance</u>, the edge of Methods PFH, PFG, and CS-PF shall be defined as the end of the header.

Committee Reason: The committee decided that the modification fixes correlation issues. The committee concluded that the proposal, as modified, clarifies where to locate the edge of a single portal frame when applying the braced wall panel spacing rules in Section R602.10.2.2. The proposal also clarifies the actual length in Table R602.10.5, footnote b, which is the length of the vertical sheathed portion of a portal frame (Vote: 10-0).

Final Hearing Results

RB200-22 AM

RB201-22

Original Proposal

IRC: SECTION 202 (New), R602.10.3.1 (New), FIGURE R602.10.3.1 (New), TABLE R602.10.3(2), TABLE R602.10.3(4)

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)

2021 International Residential Code

Add new definition as follows:

HEIGHT, LIGHT-FRAME STUD WALL. The vertical distance from the lower edge of the bottom plate to the upper edge of the upper top plate.

Add new text as follows:

R602.10.3.1 Wall Height for Wood Framing. For determination of braced wall and panel adjustment factors in accordance with Section R602.10, wall height shall be the *light-frame stud wall height* determined in accordance with Figure R602.10.3.1.

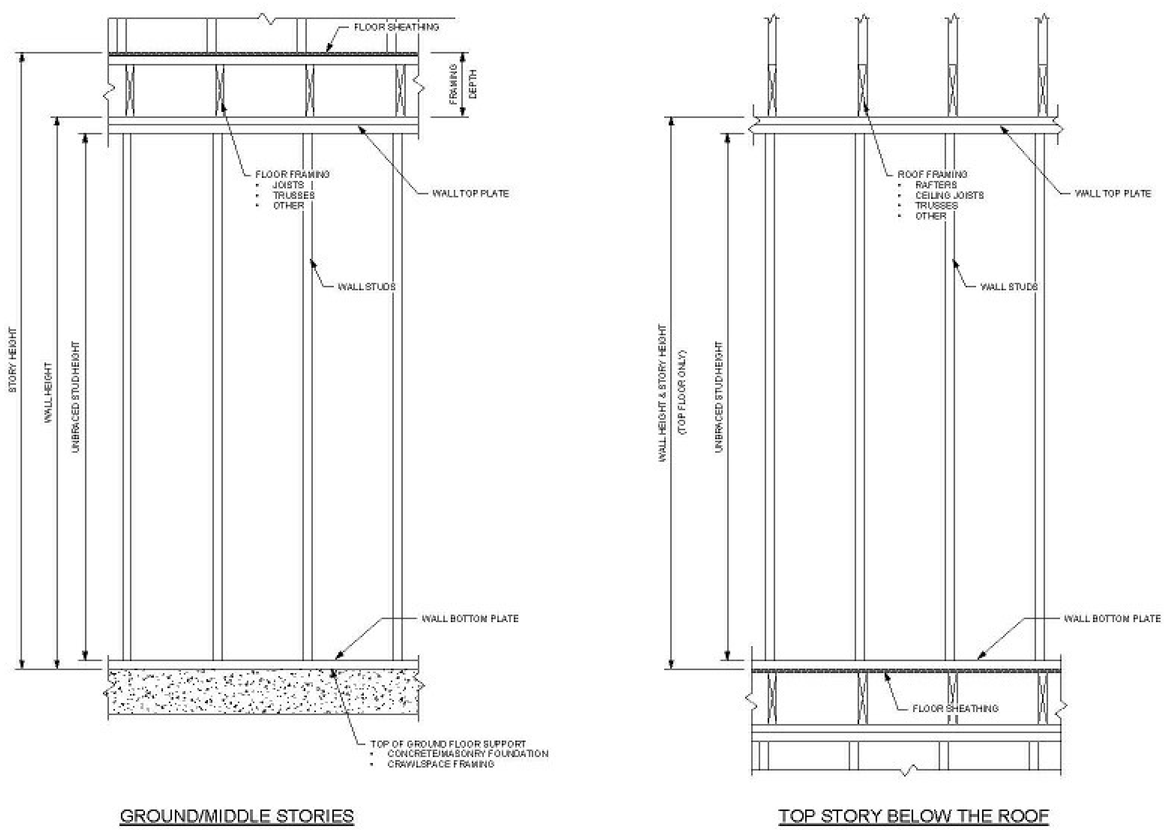


FIGURE R602.10.3.1 Wall Height for Wood Framing

Revise as follows:

TABLE R602.10.3(2) WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a, b] [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
1	Exposure category[d]	One-story structure	B	1.00	All methods
			C	1.20	
			D	1.50	
		Two-story structure	B	1.00	
			C	1.30	
			D	1.60	
		Three-story structure	B	1.00	
			C	1.40	
			D	1.70	
2	Roof eave-to-ridge height	Roof only	≤ 5 feet	0.70	
			10 feet	1.00	
			15 feet	1.30	
			20 feet	1.60	
		Roof + 1 floor	≤ 5 feet	0.85	
			10 feet	1.00	
			15 feet	1.15	
			20 feet	1.30	
		Roof + 2 floors	≤ 5 feet	0.90	
			10 feet	1.00	
			15 feet	1.10	
			20 feet	Not permitted	
3	<u>Wall Height (Section R601.10.3.1)</u> Story height (Section R301.3)	Any story	8 feet	0.90	
			9 feet	0.95	
			10 feet	1.00	
			11 feet	1.05	
			12 feet	1.10	
4	Number of braced wall lines (per plan direction)[c]	Any story	2	1.00	
			3	1.30	
			4	1.45	
			≥ 5	1.60	
5	Additional 800-pound hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
6	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
7	Gypsum board fastening	Any story	4 inches o.c. at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB
8	Horizontal blocking	Any story	Horizontal block is omitted	2.0	WSP, PBS, CS-WSP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.48 N.

a. Linear interpolation shall be permitted.

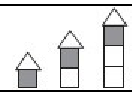
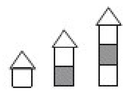
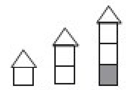
b. The total adjustment factor is the product of all applicable adjustment factors.

c. The adjustment factor is permitted to be 1.0 when determining bracing amounts for intermediate braced wall lines provided the bracing amounts on adjacent braced wall lines are based on a spacing and number that neglects the intermediate braced wall line.

d. The same adjustment factor shall be applied to all braced wall lines on all floors of the structure, based on the worst-case exposure category.

TABLE R602.10.3(4) SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY[g]	CONDITION	ADJUSTMENT FACTOR[a, b] [Multiply length from Table R602.10.3(3) by this factor]	APPLICABLE METHODS
1	<u>Wall Height (Section R601.10.3.1)</u> ~~Story height (Section 301.3)~~	Any story	≤ 10 feet	1.0	All methods
			> 10 feet and ≤ 12 feet	1.2	
2	Braced wall line spacing, townhouses in SDC C	Any story	≤ 35 feet	1.0	
			> 35 feet and ≤ 50 feet	1.43	
3	Braced wall line spacing, in SDC D_0, D_1, D_2[c]	Any story	> 25 feet and ≤ 30 feet	1.2	
			> 30 feet and ≤ 35 feet	1.4	
4	Wall dead load	Any story	> 8 psf and < 15 psf	1.0	
			< 8psf	0.85	
5	Roof/ceiling dead load for wall supporting	1-, 2- or 3-story building	≤15 psf	1.0	
		2- or 3-story building	> 15 psf and ≤ 25 psf	1.1	
		1-story building or top story	> 15 psf and ≤ 25 psf	1.2	

ITEM NUMBER	ADJUSTMENT BASED ON	STORY	CONDITION	ADJUSTMENT FACTOR [Multiply length from Table R602.10.3(3) by this factor]	APPLICABLE METHODS
6	Walls with stone or masonry veneer, townhouses in SDC C[d, e]			1.0	All methods
				1.5	
				1.5	
7	Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC D_0 - D_2[d, f]	Any story		See Section R602.10.6.5.4	BV-WSP
8	Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC D_0 - D_2[d, f]	First and second story of two-story dwelling	Limited brick veneer on second story. See Section R602.10.6.5.3.	1.2	WSP, CS-WSP
9	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
10	Horizontal blocking	Any story	Horizontal blocking omitted	2.0	WSP, PBS, CS-WSP

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. The length-to-width ratio for the floor/roof diaphragm shall not exceed 3:1.

d. Applies to stone or masonry veneer exceeding the first story height.

e. The adjustment factor for stone or masonry veneer shall be applied to all exterior braced wall lines and all braced wall lines on the interior of the building, backing or perpendicular to and laterally supporting veneered walls.

f. See Section R602.10.6.5 for requirements where stone or masonry veneer does not exceed the first-story height.

g. One- and two-family dwellings in Seismic Design Category D_2 exceeding two stories shall be designed in accordance with accepted engineering practice.

Reason: This proposal clarifies how to determine the vertical dimension of the wall height for wood stud framing, which has been subject to varying interpretations. It also cleans up braced wall adjustment factor table references (story heights) that are currently in conflict with the listed wall height dimensions.

Requirements such as braced wall line lengths and adjustment factors are based on the “wall height”, which can be ambiguous when using coffered ceilings, knee-walls, and other common framing features and techniques. Because shorter wall heights are allowed to use lower factors, there is an economic incentive to classify the wall height as short as possible. This requires a clear and concise definition of “wall height” to eliminate confusion and varying interpretations.

<u>Braced Wall Design Basis - Seismic</u>

The seismic design basis calculations for the IRC rely upon expected relationships between the story height, top of “wall height”, and the braced wall panel heights. Use of shorter wall heights in combination with taller story heights will lead to unconservative lengths of braced walls and wall panels and will compromise the structural integrity during a seismic event.

<u>Places that Wall Height is Used</u>

The following tables in Chapter 6 are keyed on variations of story height, wall height, or a similar vertical measurement:

- Table R602.10.3(1) Bracing Requirements Based on Wind Speed
- Table R602.10.5 Minimum Length of Braced Wall Panels
- Table R602.10.5.2 Partial Credit for Braced Wall Panels Less than 48 inches in Actual Length
- TABLE R602.10.3(3) Bracing Requirements Based on Seismic Design Category

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of intent and does not impose new requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

~~**HEIGHT, LIGHT-FRAME STUD WALL.**~~

~~The vertical distance from the lower edge of the bottom plate to the upper edge of the upper top plate.~~

R602.10.3.1Wall Height for Wood Framing. For determination of braced wall and panel adjustment factors in accordance with Section R602.10, wall height shall be the ~~*light-frame stud wall height*~~ vertical distance from the lower edge of the bottom plate to the upper edge of the upper top plate determined in accordance with Figure R602.10.3.1
of the upper top plate

Committee Reason: The committee concluded that the modification identifies that the definition is unnecessary and incorporated it into the section. In addition, the committee determined that the proposal, as modified, clarifies how to determine the vertical dimension of the wall height for wood stud framing (Vote: 10-0).

Final Hearing Results

RB201-22	AM

RB202-22

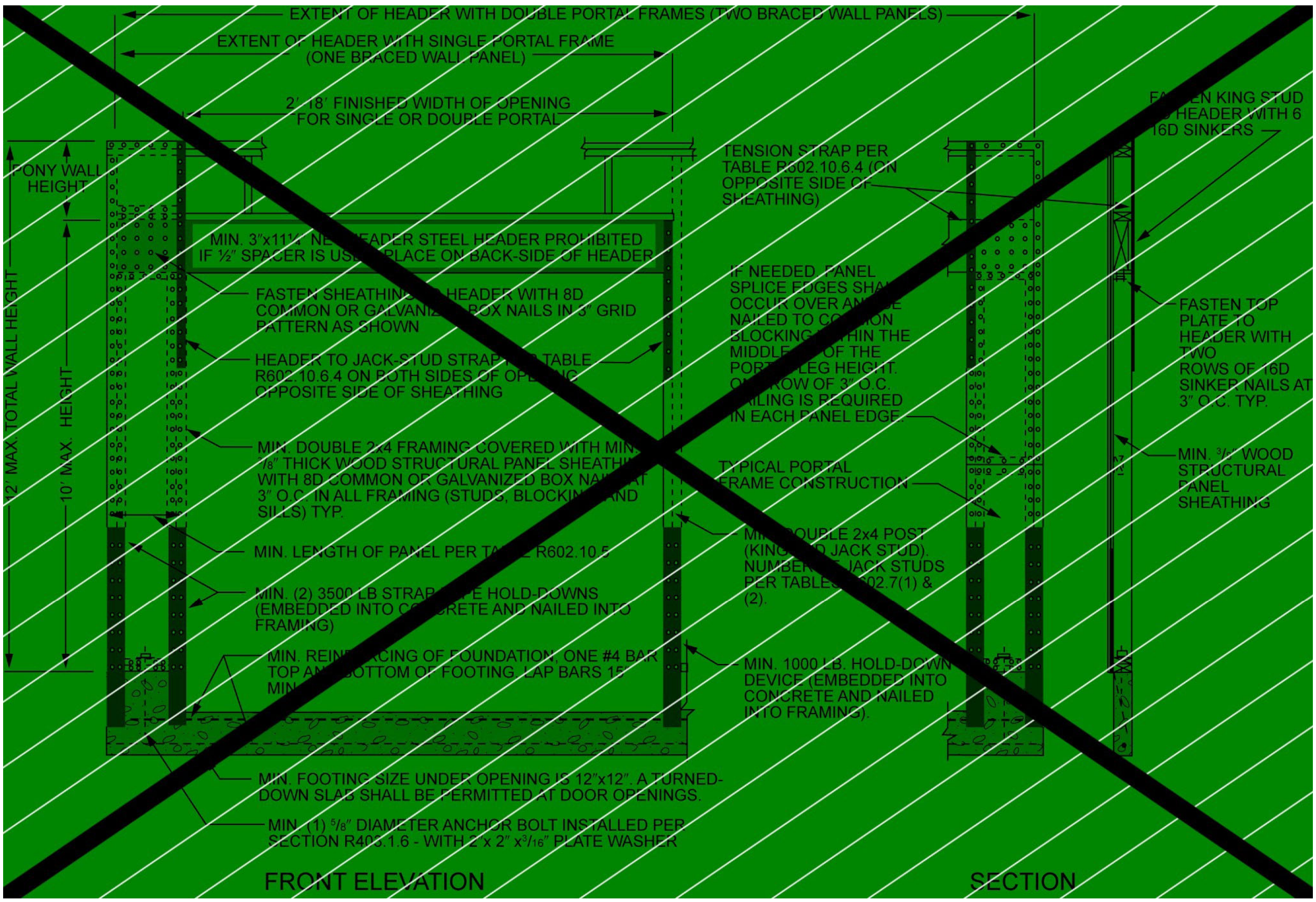
Original Proposal

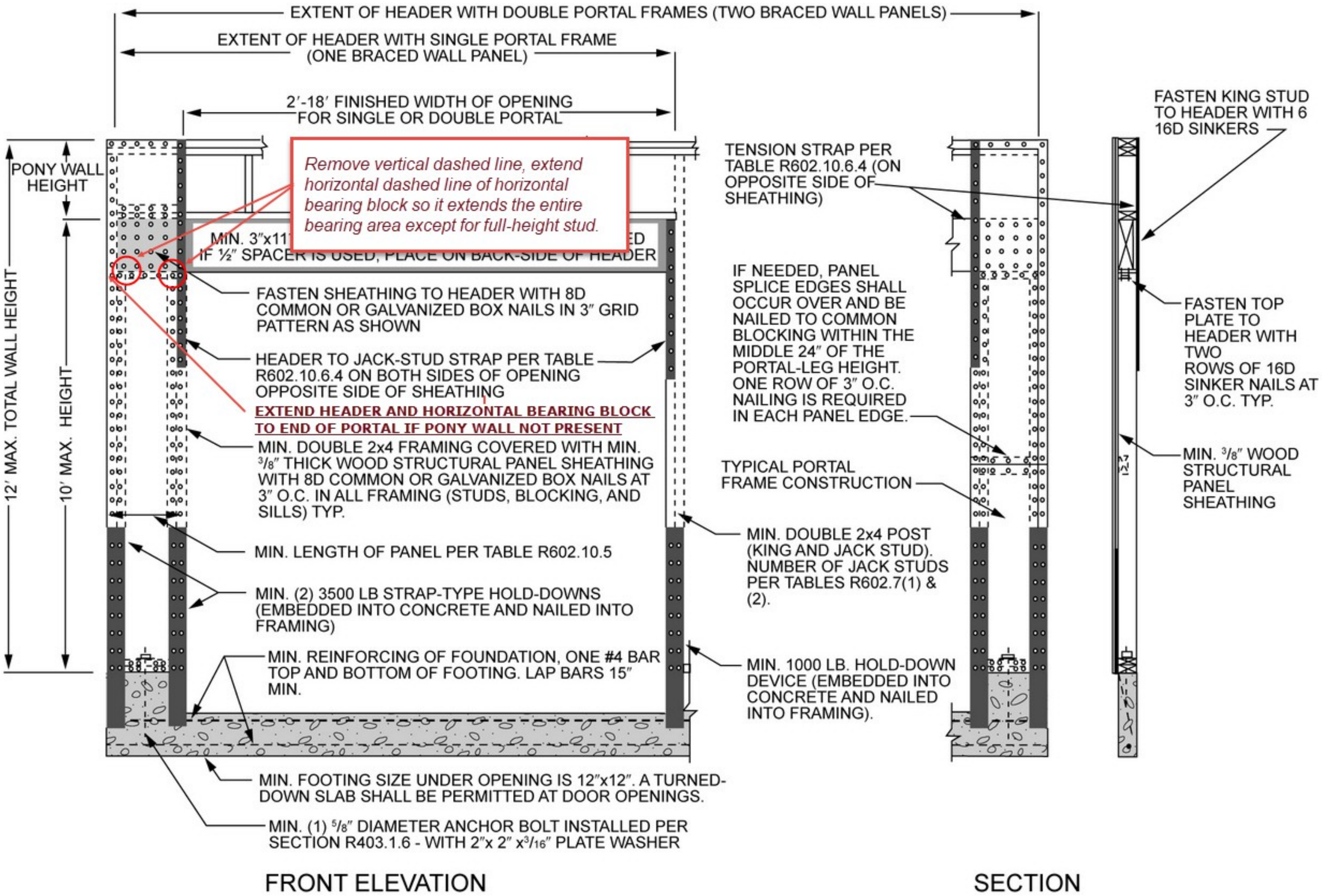
IRC: FIGURE R602.10.6.2

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:





For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

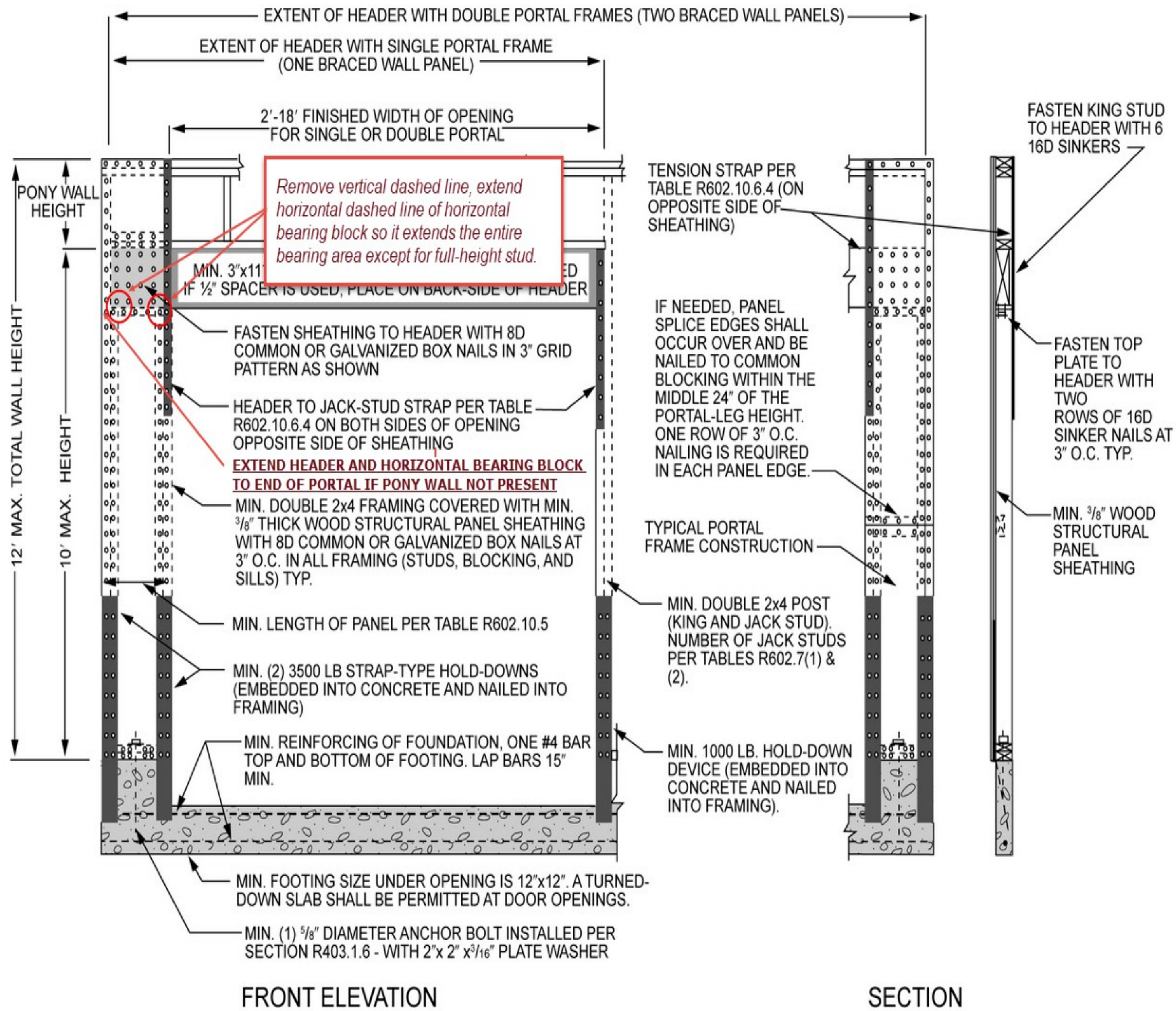
Reason: This proposal is made to correct the PFH Figure to reflect how the portal frame was originally tested. In the original testing, the horizontal bearing block beneath the end of the header extended the full bearing width of the vertical section. That is reflected in the photo shown below, taken from the original APA testing as reported in T2002-46. Currently it appears as if the vertical studs extend completely up to the header. A note is also needed to be added that in the event that there is not a pony wall above the header, the header and the bearing block need to extend completely to the end of the portal frame, again to reflect the original testing. Note that if this is accepted, the illustration will match those of the PFG and CS-PF.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change just clarifies how the bearing of the header at each end is constructed. It should not result in any increase or decrease in costs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:



Revise Note in center of portal as follows;

~~Extend header and horizontal bearing block to end of portal if pony wall not present~~

<u>Header is permitted to extend to the end of a portal with a bearing block if pony wall not present and a 1000 pound tension strap is provided</u>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

Committee Reason: The committee determined that the modification provides another option and clarifies the requirements. The committee decided that the proposal, as modified, accurately reflects how the portal frame was initially being tested in PFH Figure (Vote: 9-1).

Final Hearing Results

RB202-22 AM

RB203-22

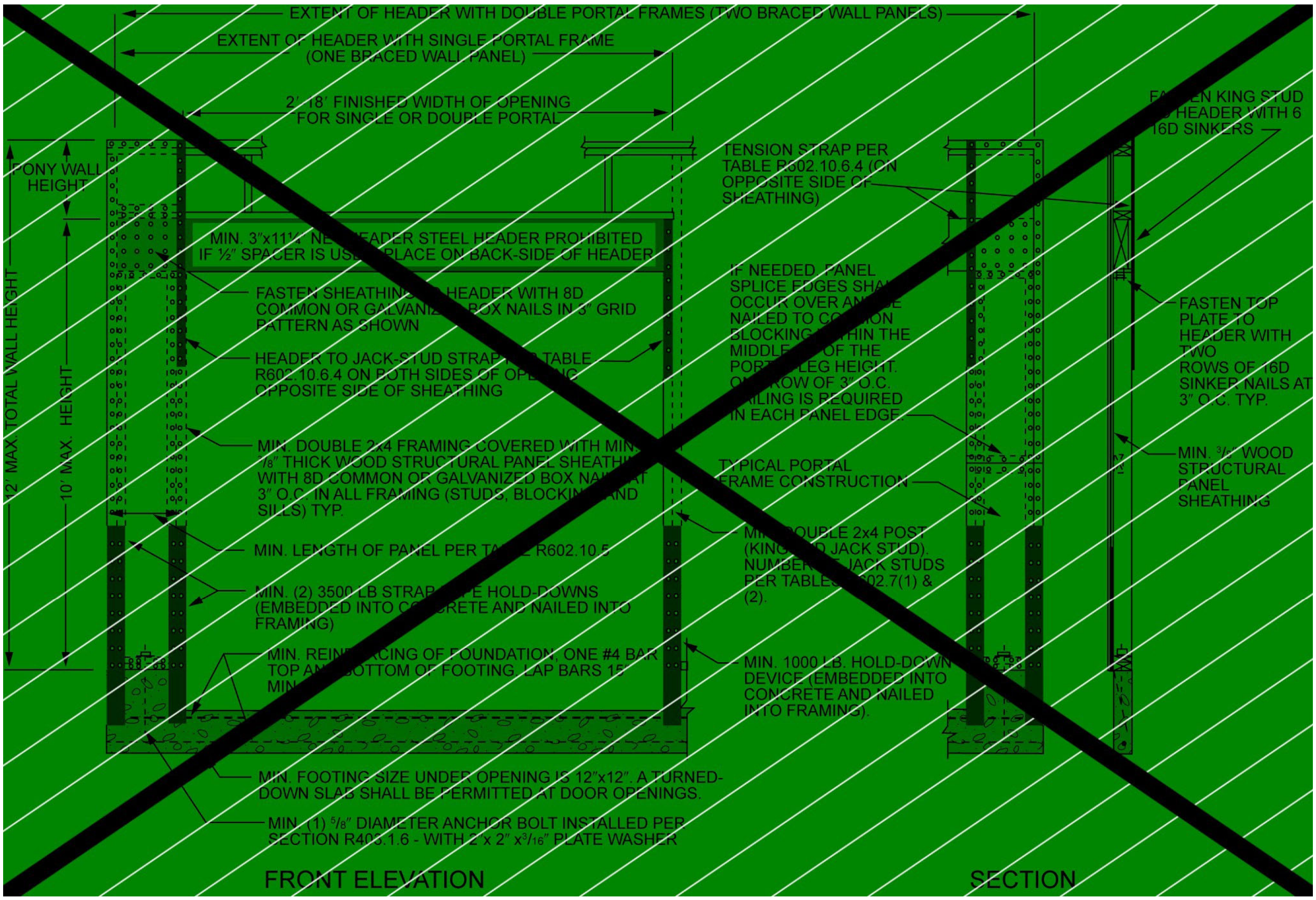
Original Proposal

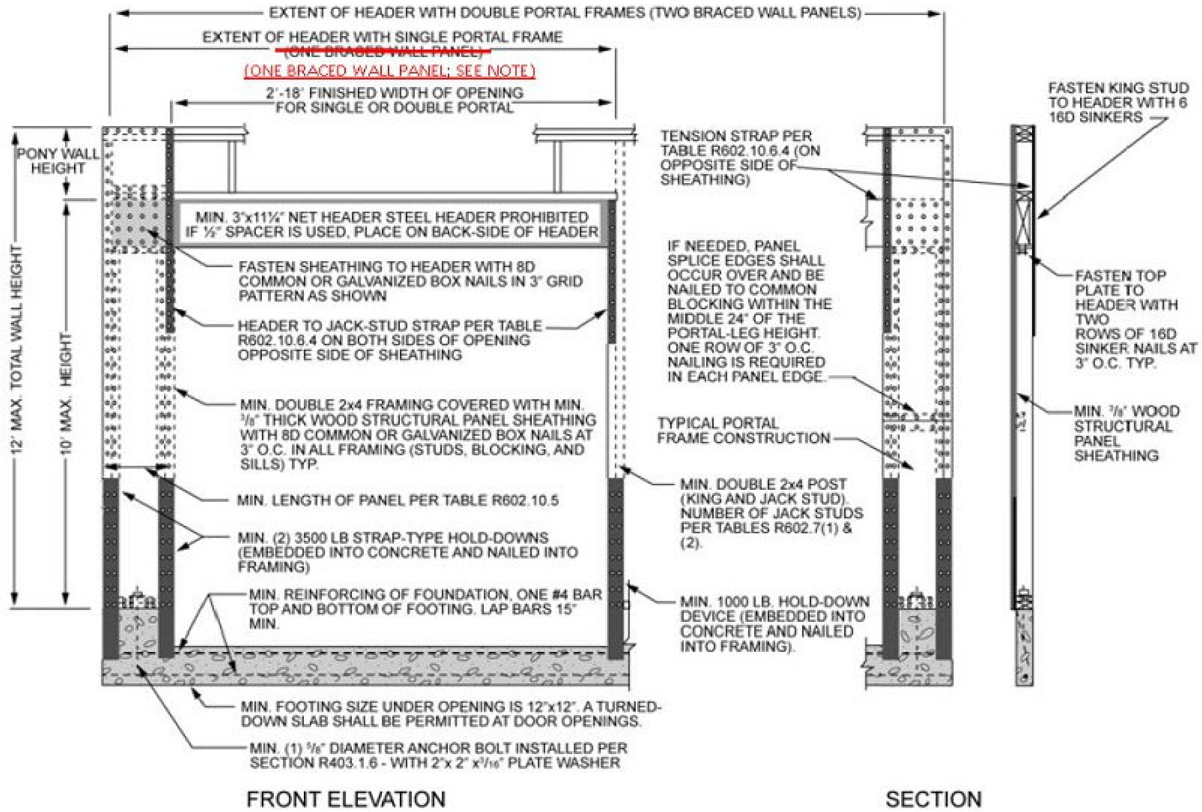
IRC: FIGURE R602.10.6.2, FIGURE R602.10.6.3, FIGURE R602.10.6.4

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Residential Code

Revise as follows:

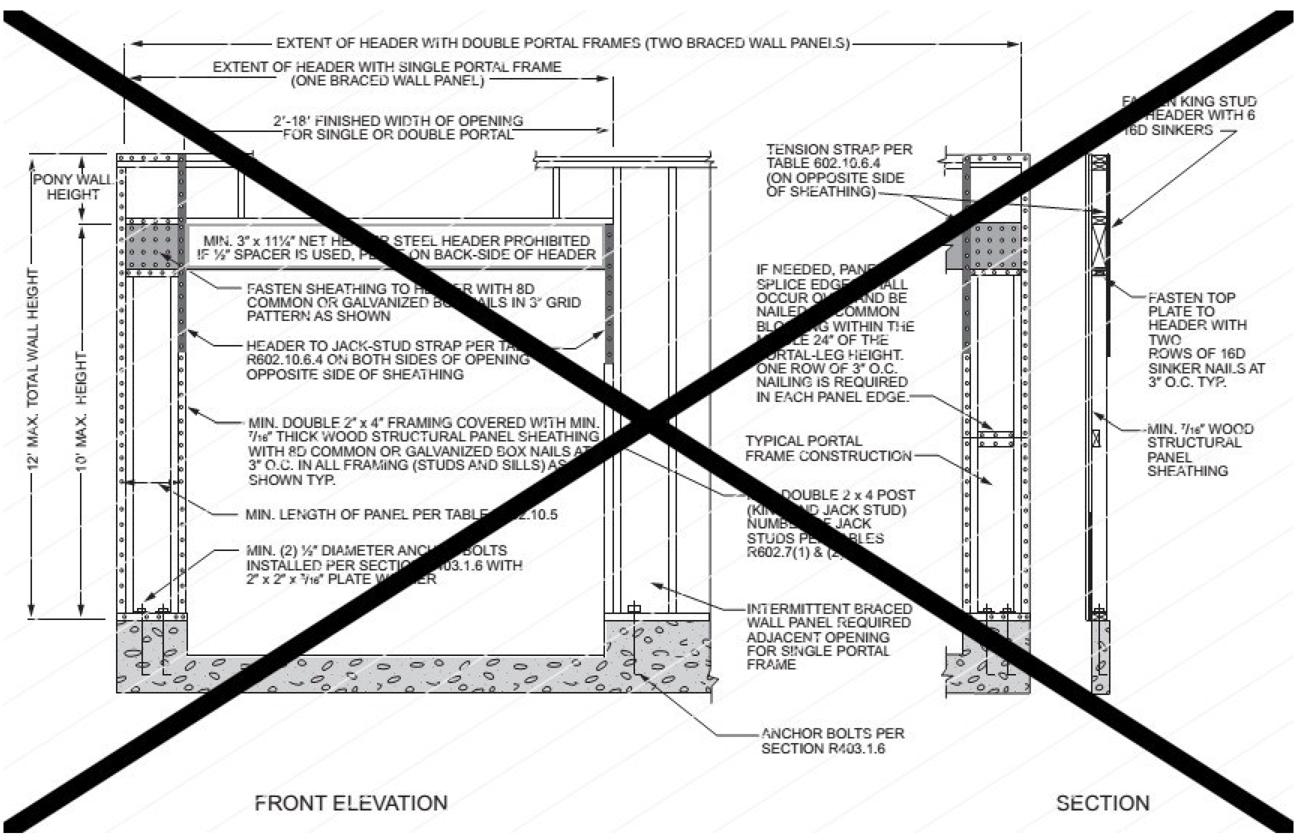


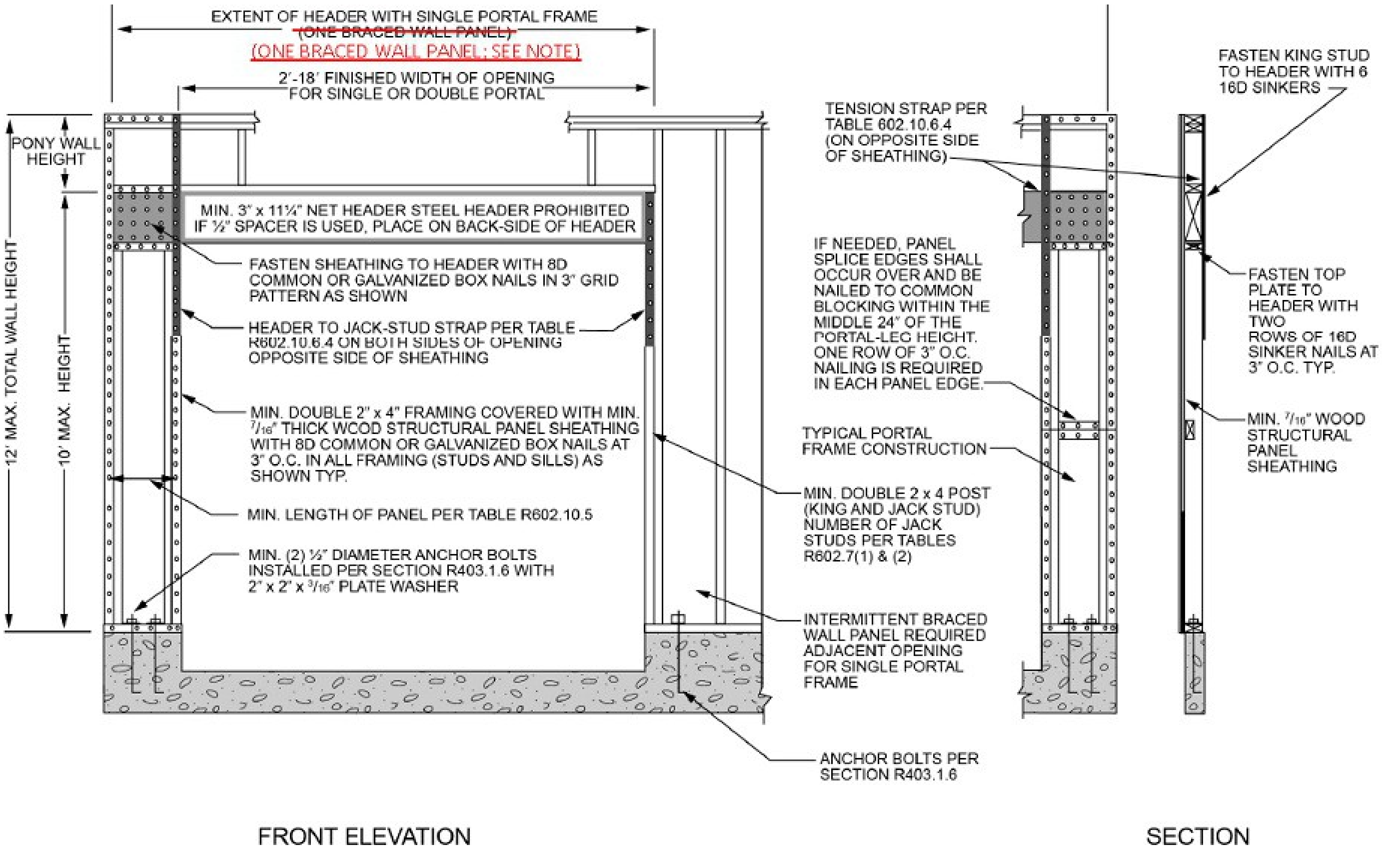


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note: Header shall not extend over more than one opening.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

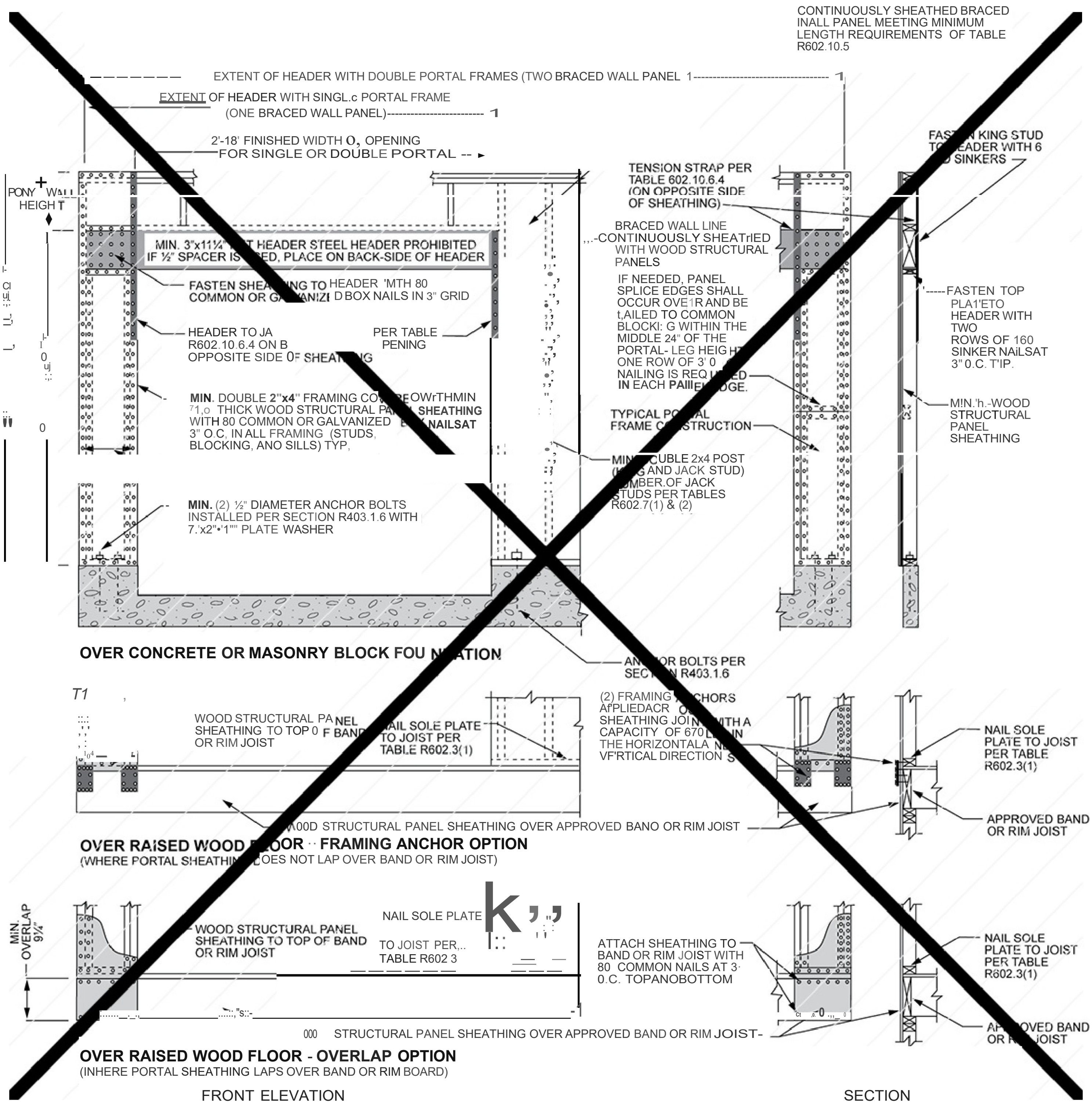




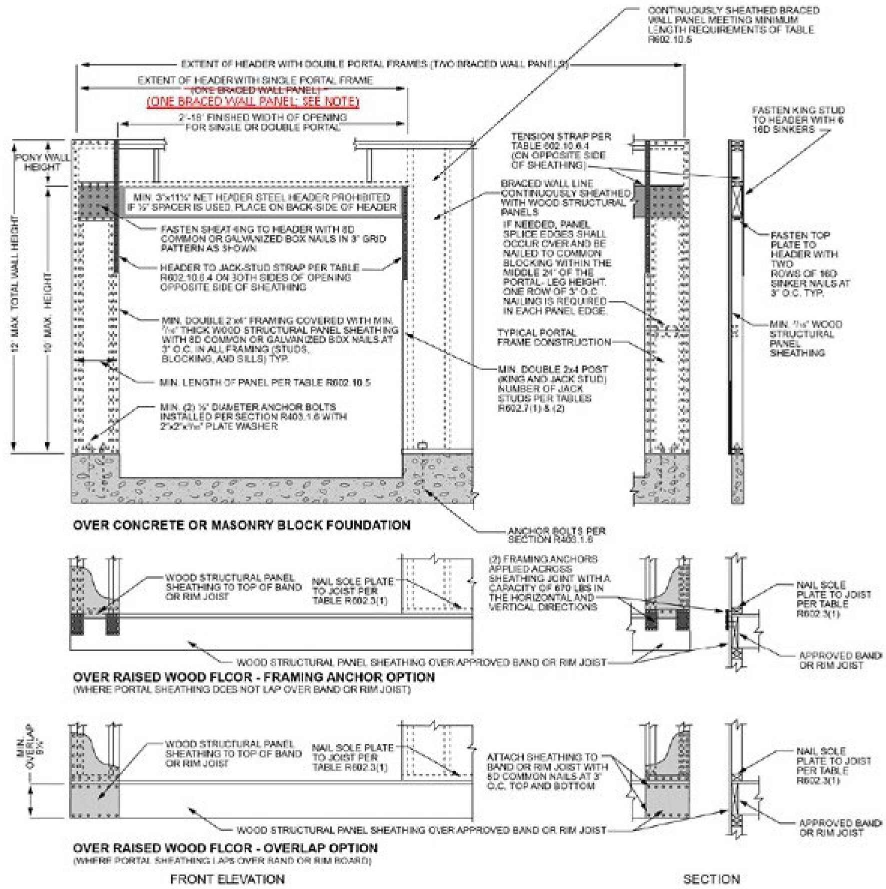
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

NOTE: Header shall not extend over more than one opening.

FIGURE R602.10.6.3 METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C



CONTINUOUSLY SHEATHED BRACED WALL PANEL MEETING MINIMUM LENGTH REQUIREMENTS OF TABLE R602.10.5
EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES (TWO BRACED WALL PANEL
EXTENT OF HEADER WITH SINGLE PORTAL FRAME (ONE BRACED WALL PANEL)
2'-18' FINISHED WIDTH OF OPENING FOR SINGLE OR DOUBLE PORTAL
PONY WALL HEIGHT
MIN. 3"x11¼" NET HEADER STEEL HEADER PROHIBITED IF ½" SPACER IS USED, PLACE ON BACK-SIDE OF HEADER
FASTEN SHEATHING TO HEADER WITH 80 COMMON OR GALVANIZED BOX NAILS IN 3" GRID
HEADER TO JACK STUD STRAP PER TABLE R602.10.6.4 ON BOTH SIDES OF OPENING OPPOSITE SIDE OF SHEATHING
MIN. DOUBLE 2"x4" FRAMING COVERED WITH MIN THICK WOOD STRUCTURAL PANEL SHEATHING WITH 80 COMMON OR GALVANIZED BOX NAILS AT 3" O.C. IN ALL FRAMING (STUDS, BLOCKING, AND SILLS) TYP.
MIN. (2) ½" DIAMETER ANCHOR BOLTS INSTALLED PER SECTION R403.1.6 WITH PLATE WASHER
TENSION STRAP PER TABLE 602.10.6.4 (ON OPPOSITE SIDE OF SHEATHING)
BRACED WALL LINE
CONTINUOUSLY SHEATHED WITH WOOD STRUCTURAL PANELS
IF NEEDED, PANEL SPLICE EDGES SHALL OCCUR OVER AND BE NAILED TO COMMON BLOCKING WITHIN THE MIDDLE 24" OF THE PORTAL LEG HEIGHT. ONE ROW OF 3' O.C. NAILING IS REQUIRED IN EACH PANEL EDGE.
TYPICAL PORTAL FRAME CONSTRUCTION
MIN. DOUBLE 2x4 POST (KING AND JACK STUD) NUMBER OF JACK STUDS PER TABLES R602.7(1) & (2)
FASTEN KING STUD TO HEADER WITH 6 SINKERS
FASTEN TOP PLATE TO HEADER WITH TWO ROWS OF 16D SINKER NAILS AT 3" O.C. TYP.
MIN. WOOD STRUCTURAL PANEL SHEATHING
OVER CONCRETE OR MASONRY BLOCK FOUNDATION
ANCHOR BOLTS PER SECTION R403.1.6
WOOD STRUCTURAL PANEL SHEATHING TO TOP OF BAND OR RIM JOIST
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
(2) FRAMING ANCHORS APPLIED ACROSS SHEATHING JOINT WITH A CAPACITY OF 670 LBS IN THE HORIZONTAL DIRECTION
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
APPROVED BAND OR RIM JOIST
WOOD STRUCTURAL PANEL SHEATHING OVER APPROVED BAND OR RIM JOIST
OVER RAISED WOOD FLOOR - FRAMING ANCHOR OPTION
(WHERE PORTAL SHEATHING DOES NOT LAP OVER BAND OR RIM JOIST)
MIN. OVERLAP 9¼"
WOOD STRUCTURAL PANEL SHEATHING TO TOP OF BAND OR RIM JOIST
NAIL SOLE PLATE TO JOIST PER TABLE R602.3
ATTACH SHEATHING TO BAND OR RIM JOIST WITH 80 COMMON NAILS AT 3" O.C. TOP AND BOTTOM
NAIL SOLE PLATE TO JOIST PER TABLE R602.3(1)
APPROVED BAND OR RIM JOIST
WOOD STRUCTURAL PANEL SHEATHING OVER APPROVED BAND OR RIM JOIST
OVER RAISED WOOD FLOOR - OVERLAP OPTION
(WHERE PORTAL SHEATHING LAPS OVER BAND OR RIM BOARD)
FRONT ELEVATION
SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
NOTE: Header shall not extend over more than one opening.

FIGURE R602.10.6.4 METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

Reason: The intent of this change proposal is to clarify the header requirement for portal frames and to limit the header to a single-span configuration, as originally tested, with double portal frames. This question has been frequently raised in the field and is worth clarification in the IRC.Portal frames first appeared in the 2009 IRC and were based on tests conducted by APA and NAHB, in which the headers were tested in a single-span configuration. While it can be argued that this is reflected in the detailed drawings of the existing Figures R602.10.6.2, R602.10.6.3, and R602.10.6.4, a careful examination is usually required to spot such a subtle difference. The addition of the clarification note as proposed will make these figures easier to follow and less prone to confusion. In practical applications, continuous headers if purchased for double portal frames can be cut into 2 single-span headers before installation into each portal frame.

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 because it clarifies the double portal frame construction as originally intended.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee decided that the proposal clarifies the header requirement for portal frames and limits the header to a single-span configuration, as originally tested, with double portal frames (Vote: 10-0).

Final Hearing Results

RB203-22	AS

RB204-22

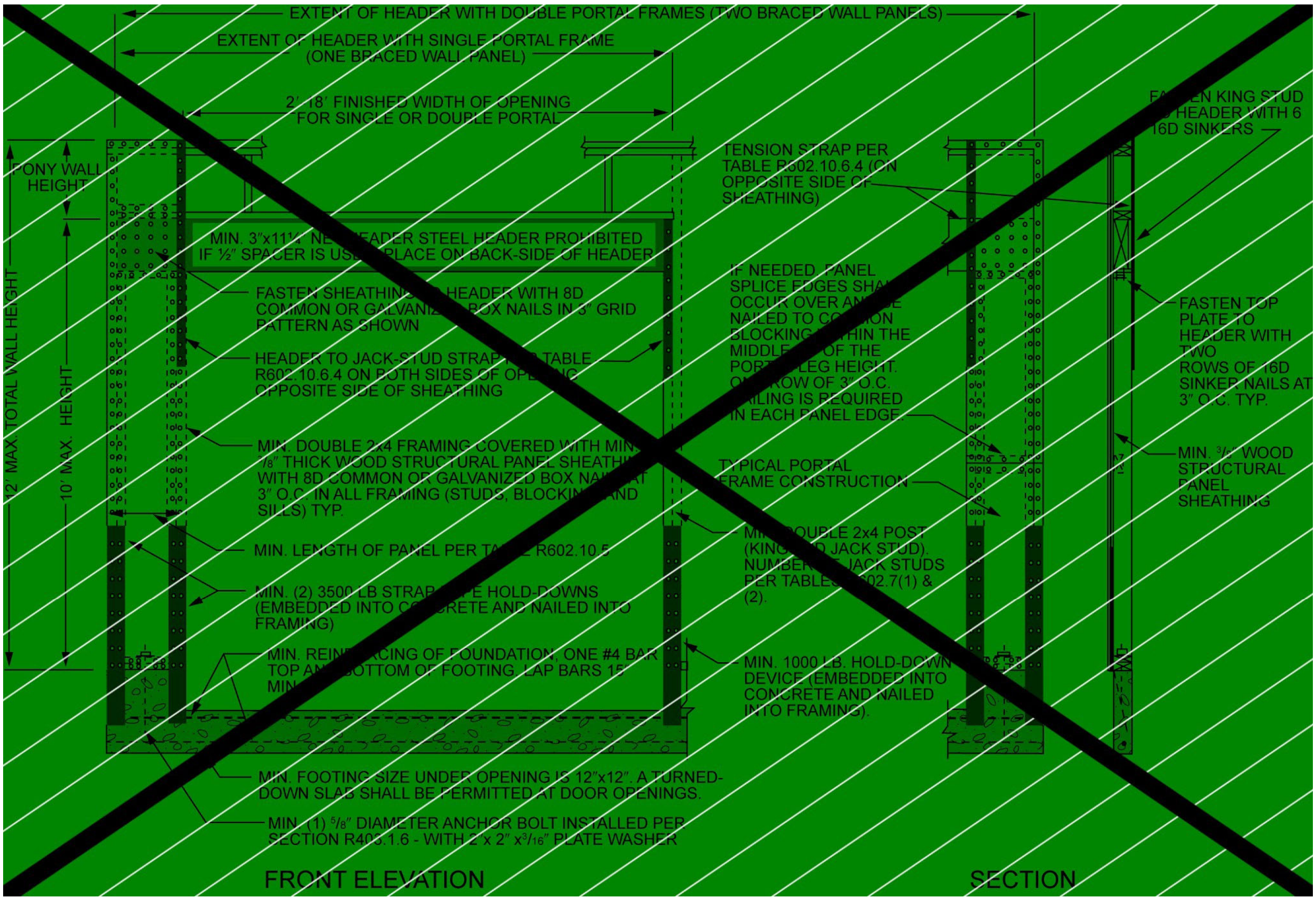
Original Proposal

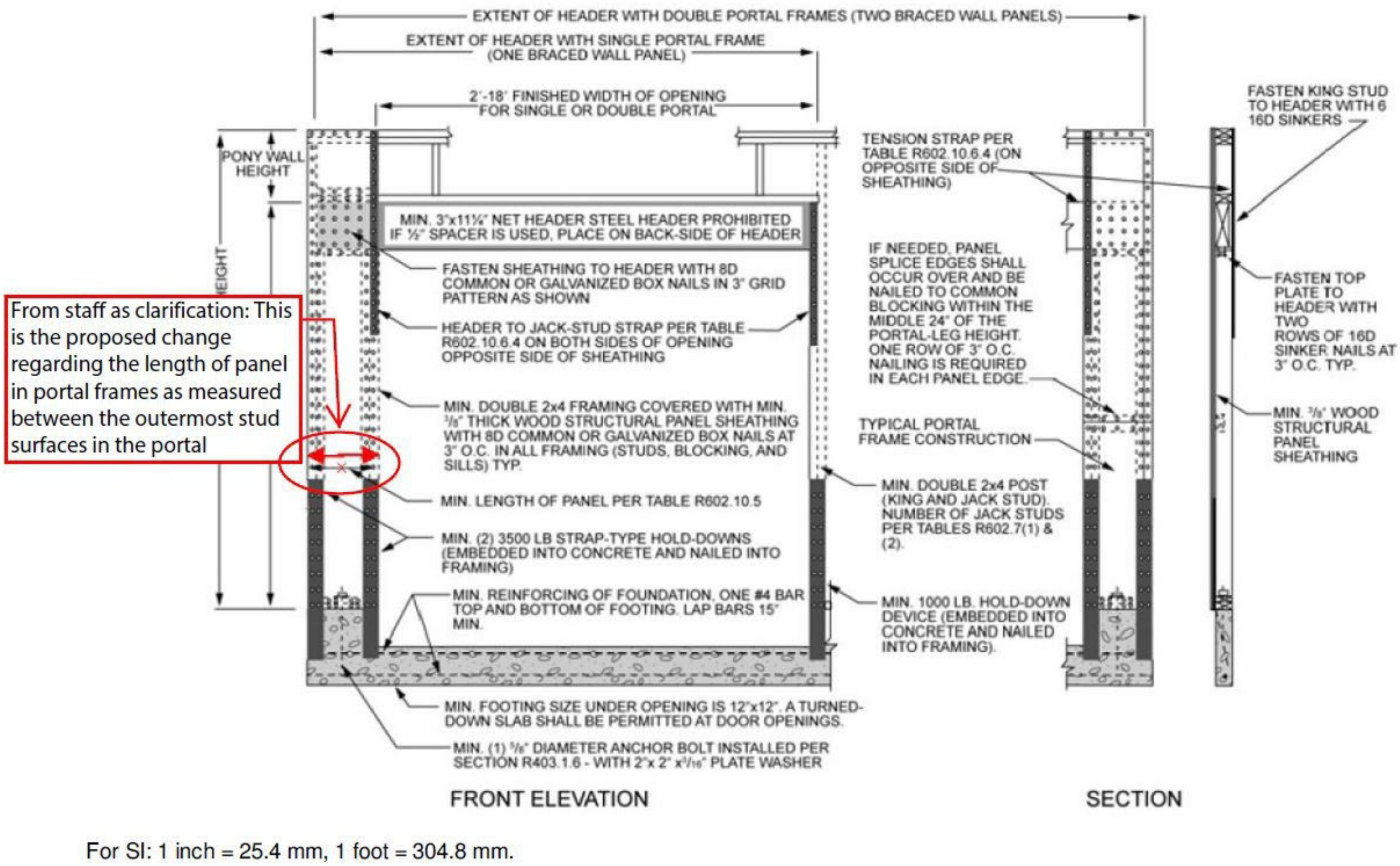
IRC: FIGURE R602.10.6.2, FIGURE R602.10.6.3, FIGURE R602.10.6.4

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2021 International Residential Code

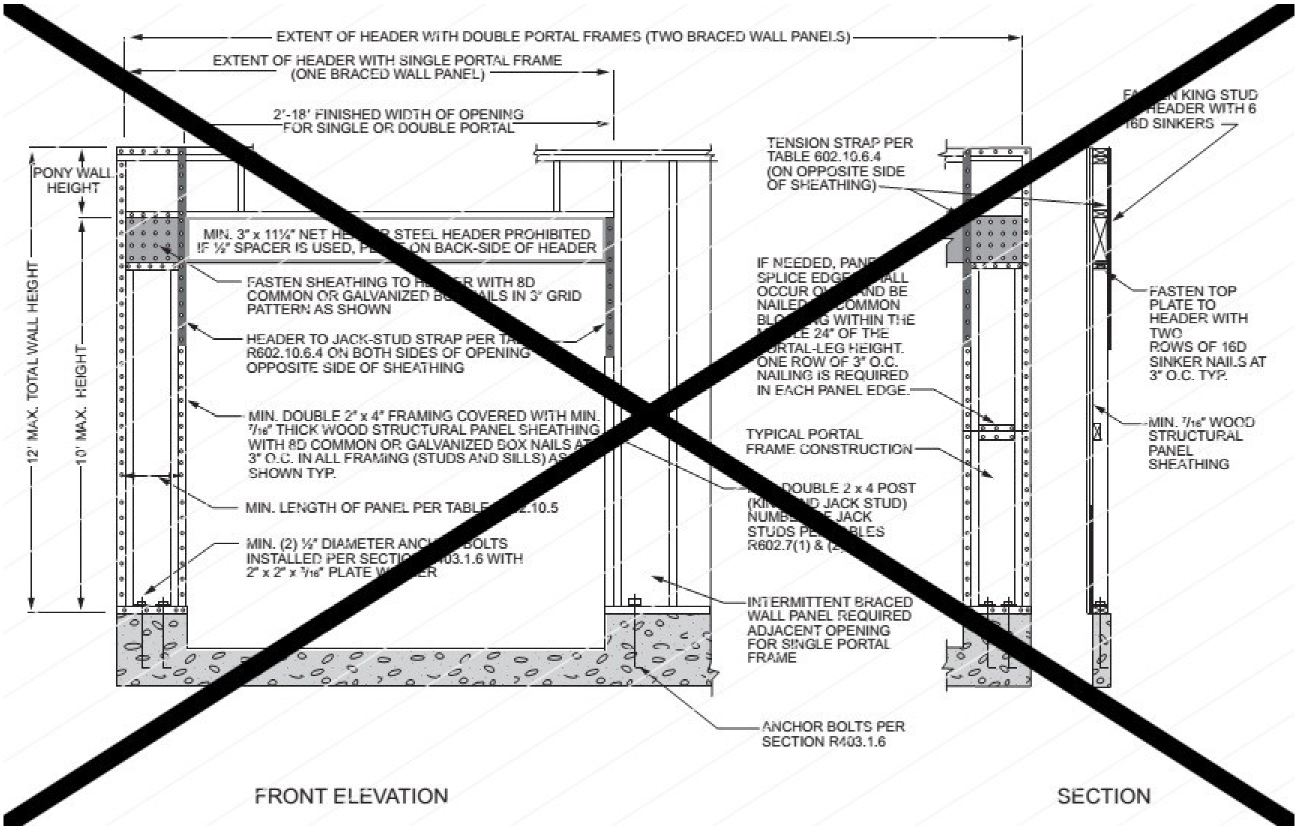
Revise as follows:

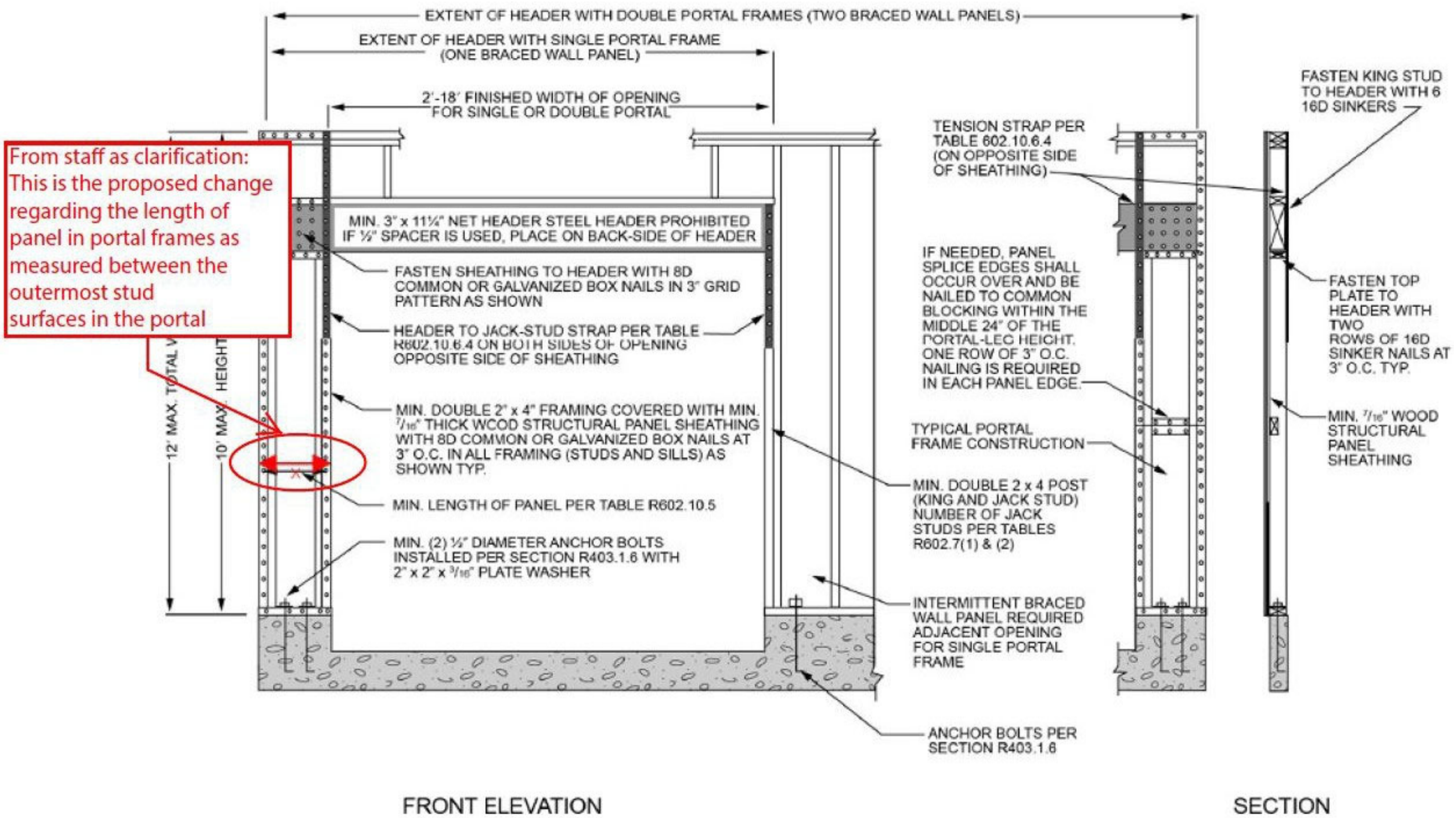




For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

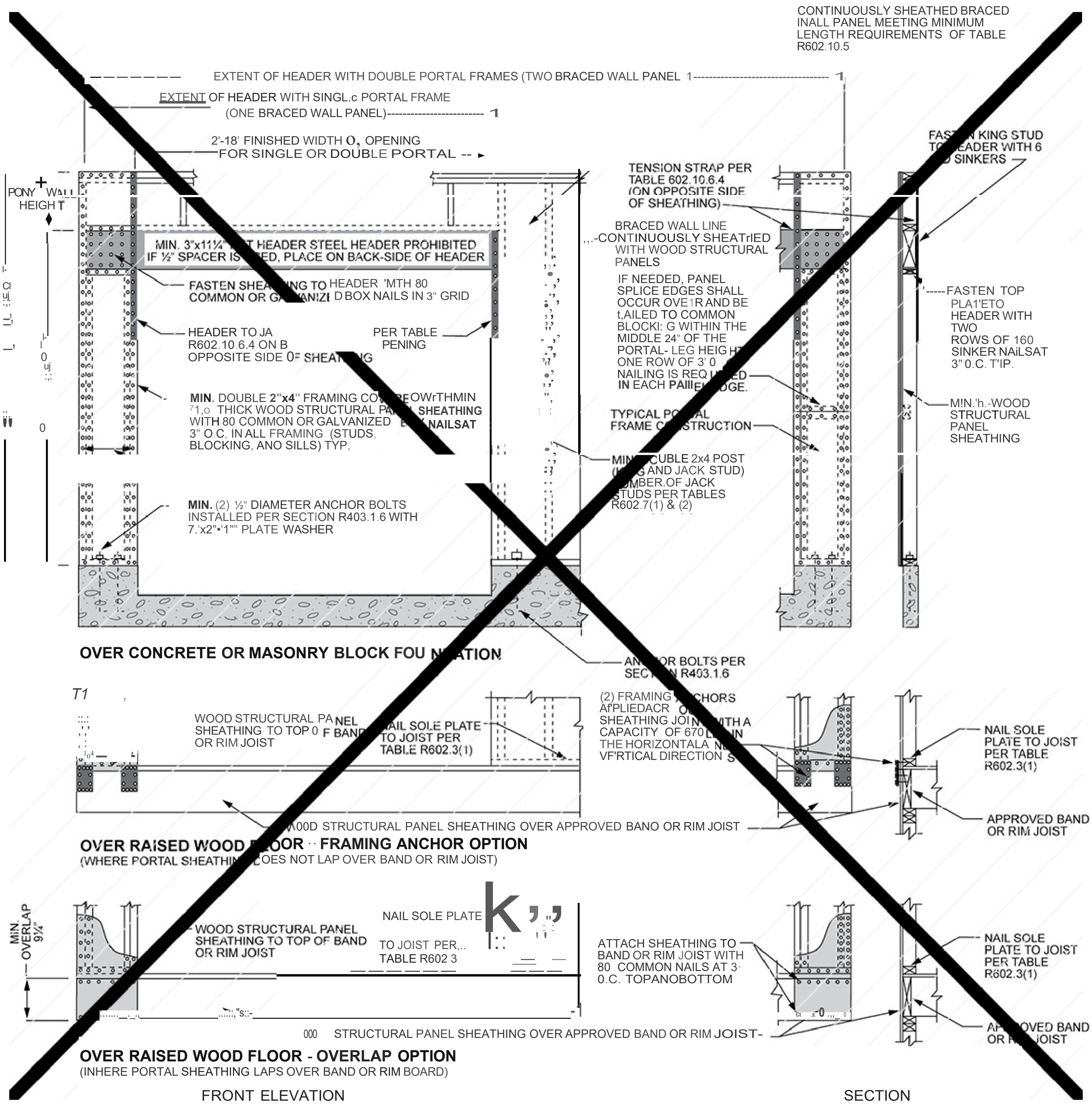


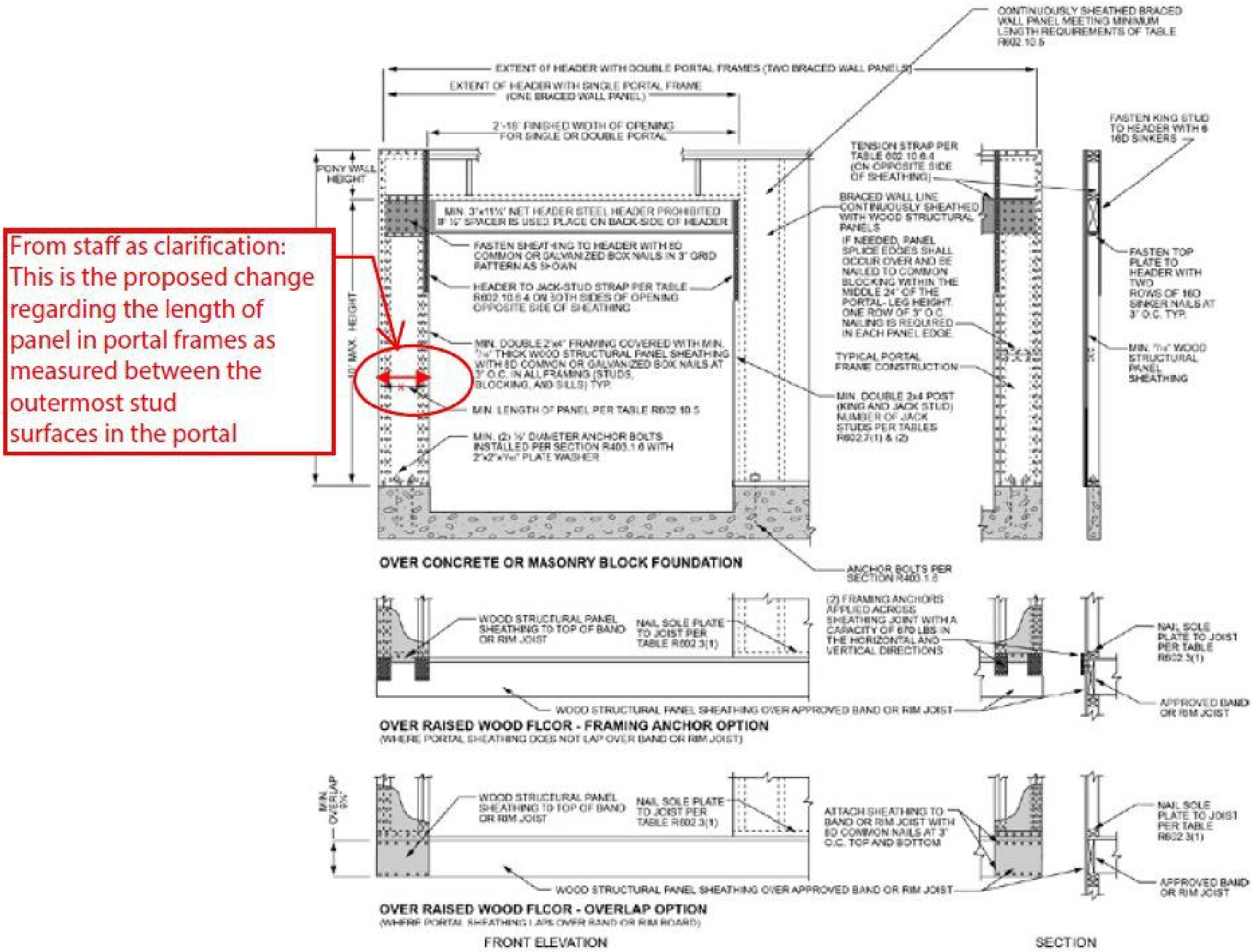


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.3 METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C


CONTINUOUSLY SHEATHED BRACED
INALL PANEL MEETING MINIMUM
LENGTH REQUIREMENTS OF TABLE
R602.10.5
EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES (TWO BRACED WALL PANEL
EXTENT OF HEADER WITH SINGL.c PORTAL FRAME
(ONE BRACED WALL PANEL)
2'-18' FINISHED WIDTH O, OPENING
FOR SINGLE OR DOUBLE PORTAL
PONY WALL
HEIGHT
TENSION STRAP PER
TABLE 602.10.6.4
(ON OPPOSITE SIDE
OF SHEATHING)
BRACED WALL LINE
CONTINUOUSLY SHEATrIED
WITH WOOD STRUCTURAL
PANELS
IF NEEDED, PANEL
SPLICE EDGES SHALL
OCCUR OVE1R AND BE
t,AILED TO COMMON
BLOCKI: G WITHIN THE
MIDDLE 24" OF THE
PORTAL- LEG HEIG
ONE ROW OF 3' 0
NAILING IS REQ
IN EACH PAIII
FASTEN TOP
PLA1'ETO
HEADER WITH
TWO
ROWS OF 160
SINKER NAiLSAT
3" 0.C. T'IP.
MIN. 3"x11¼"
IF ½" SPACER IS
STEEL HEADER PROHIBITED
PLACE ON BACK-SIDE OF HEADER
FASTEN SHEA
COMMON OR GA
HEADER 'MTH 80
D BOX NAILS IN 3" GRID
HEADER TO JA
R602.10.6.4 ON B
OPPOSITE SIDE 0F SHEAT
PER TABLE
PENING
MIN. DOUBLE 2"x4" FRAMING CO
THICK WOOD STRUCTURAL PA
WITH 80 COMMON OR GALVANIZED
3" O.C. IN ALL FRAMING (STUDS,
BLOCKING, ANO SILLS) TYP,
SHEATHING
NAILSAT
TYPICAL PO
FRAME C
STRUCTION
MIN.'h.-WOOD
STRUCTURAL
PANEL
SHEATHING
MIN. (2) ½" DIAMETER ANCHOR BOLTS
INSTALLED PER SECTION R403.1.6 WITH
7.'x2"•'1"" PLATE WASHER
UBLE 2x4 POST
AND JACK STUD)
BER.OF JACK
STUDS PER TABLES
R602.7(1) & (2)
OVER CONCRETE OR MASONRY BLOCK FOU
ATION
SECT
R403.1.6
WOOD STRUCTURAL PA
SHEATHING TO TOP 0
OR RIM JOIST
NAIL SOLE PLATE
TO JOIST PER
TABLE R602.3(1)
(2) FRAMING
AfPLIEDACR
SHEATHING JOI
CAPACITY OF 670
THE HORIZONTALA
VF'RTICAL DIRECTION
NAIL SOLE
PLATE TO JOIST
PER TABLE
R602.3(1)
APPROVED BAND
OR RIM JOIST
STRUCTURAL PANEL SHEATHING OVER APPROVED BANO OR RIM JOIST
OVER RAISED WOOD
FRAMING ANCHOR OPTION
(WHERE PORTAL SHEATHI
OES NOT LAP OVER BAND OR RIM JOIST)
MIN. OVERLAP 9¼"
WOOD STRUCTURAL PANEL
SHEATHING TO TOP OF BAND
OR RIM JOIST
NAIL SOLE PLATE
TO JOIST PER,..
TABLE R602 3
ATTACH SHEATHING TO
BAND OR RIM JOIST WITH
80 COMMON NAILS AT 3
0.C. TOPANOBOTTOM
NAIL SOLE
PLATE TO JOIST
PER TABLE
R602.3(1)
STRUCTURAL PANEL SHEATHING OVER APPROVED BAND OR RIM JOIST
OVER RAISED WOOD FLOOR - OVERLAP OPTION
(INHERE PORTAL SHEATHING LAPS OVER BAND OR RIM BOARD)
FRONT ELEVATION
SECTION



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.4 METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

Reason: The length of panel in portal frames should be based on the length of the portal segment, as measured between the outermost stud surfaces in the portal. This was how the portal frame was tested and published in previous editions of the IRC (e.g., Figure R602.10.6.2 of the 2006 IRC, and Figures R602.10.3.3 and R602.10.3.4 of the 2009 IRC). Unfortunately, these figures have been redrawn many times over the years, resulting in Figures R602.10.6.2, R602.10.6.3, and R602.10.6.4 of the current (2021) IRC, which seem to show the distance between the outermost rows of nails. There have been no code change proposals to make such a subtle change over the years and it is believed that this is simply a detail in those figures that were overlooked. However, this has caused some questions by some code users to ICC staff who contacted APA for clarification. The intent of this proposal is to clarify it, as shown by the double-headed arrows in those figures, for consistency with the original portal frame figures that were previously approved by the IRC.

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 because it clarifies the length of panel in the portal frames as originally intended without changing the material or labor requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal corrects the length of panel in portal frames based on the length of the portal segment, as measured between the outermost stud surfaces in the portal (Vote: 10-0).

Final Hearing Results

RB204-22	AS

RB205-22

Original Proposal

IRC: R606.1.1, R606.2.10, R606.12.2.3.1, R606.12.2.3.2, R703.12, TMS Chapter 44

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)

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Revise as follows:

R606.1.1 Professional registration not required. Where ~~the empirical design provisions of Appendix A of TMS 402,~~the provisions of TMS 403, or the provisions of this section are used to design masonry, project drawings, typical details and specifications are not required to bea the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

R606.2.10 Mortar for AAC masonry. Thin-bed mortar for AAC masonry shall comply with Article2.2 D.1~~2.1 C.1~~ of TMS 602. Mortar used for the leveling courses of AAC masonry shall comply with Article 2.2 D.2 ~~2.1 C.2~~ of TMS 602.

R606.12.2.3.1 Connections to masonry shear walls. Connectors shall be provided to transfer forces between masonry walls and horizontal elements in accordance with the requirements of Chapter 4 ~~Section 4.1.4~~ of TMS 402. Connectors shall be designed to transfer horizontal design forces acting either perpendicular or parallel to the wall, but not less than 200 pounds per linear foot (2919 N/m) of wall. The maximum spacing between connectors shall be 4 feet (1219 mm). Such anchorage mechanisms shall not induce tension stresses perpendicular to grain in ledgers or nailers.

R606.12.2.3.2 Connections to masonry columns. Connectors shall be provided to transfer forces between masonry columns and horizontal elements in accordance with the requirements of Chapter 4 ~~Section 4.1.4~~ of TMS 402. Where anchor bolts are used to connect horizontal elements to the tops of columns, the bolts shall be placed within lateral ties. Lateral ties shall enclose both the vertical bars in the column and the anchor bolts. There shall be not less than two No. 4 lateral ties provided in the top 5 inches (127 mm) of the column.

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall comply with the requirements of Section R703.7.3 and the requirements in Sections 13.1~~12.1~~ and 13.3 ~~12.3~~ of TMS 402. Adhered masonry veneer shall be installed in accordance with Section R703.7.1, Article 3.3D~~3.3C~~ of TMS 602 or the manufacturer's instructions.

TMS

The Masonry Society
105 South Sunset Street, Suite Q
Longmont, CO 80501

402–~~2016~~ 2022	Building Code Requirements for Masonry Structures
602–~~2016~~ 2022	Specification for Masonry Structures

Reason: This change updates the IRC references and requirements to TMS 402-22 and TMS 602-22. In most cases, the changes are entirely related to moving provisions and updating the references. The deletion of the permission to use empirical design is needed because that appendix has been removed from TMS 402-22 as the Committee no longer supports the provisions for new construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change simply updates references. As such, there is no impact on construction costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with updating the existing standards TMS 402 & TMS 602 for building code requirements for masonry structures and specifications for masonry structures to the 2022 provisions. The proposal deletes the use of empirical design in Appendix A of TMS 402 since the appendix has been removed from TMS 402-22 (Vote: 10-0).

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

RB205-22	AS

RB206-22

Original Proposal

IRC: R606.12.4.3 (New), R908.1.1 (New), AJ108.4

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)

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Add new text as follows:

R606.12.4.3 Unreinforced Masonry Parapets. Unreinforced masonry parapets located in Seismic Design Category D_2, shall have wall anchors installed at the roofline and bracing above the roofline whenever a *reroofing permit* is issued, and work involves removal of roofing materials from more than 25 percent of the roof area. Such masonry bracing and wall anchors shall be of an *approved* design, unless an evaluation demonstrates compliance of the existing bracing and anchorage.

Exception: Bracing above the roof line shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.

R908.1.1 Structure. Whenever a *reroofing permit* is issued for work done in Seismic Design Category D_2, parapets constructed of unreinforced masonry shall comply with R606.12.4.3.

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES

SECTION AJ108
RENOVATIONS

Revise as follows:

AJ108.4 Structural. ~~Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.~~

Reason: Appendix AJ has not been updated to correlate with changes in the IRC and IEBC provisions that have occurred during recent code cycles. This proposal aligns the unbraced masonry provisions of Appendix AJ with similar IEBC Section 503.6 provisions and relocates these provisions within the main body of the IRC. This provision applies only to the highest seismic design category, D_2, and targets unreinforced masonry elements which have proven to be exceptionally vulnerable to ground shaking from earthquakes.

Photo of damage to masonry building in Christchurch.

COURTESY OF FRED TURNER, AVAILABLE AT WWW.EERI.ORG, LAST ACCESSED 8/3/19

Unreinforced parapets (Figure 1) have proven to be vulnerable to ground motion. Aside from the damage to the building, falling masonry poses a hazard to occupants sheltering in the building and pedestrians immediately outside of the building. This vulnerability can be significantly reduced by installing braces to reduce the unsupported length of masonry that projects above the roof decking (Figure 2).

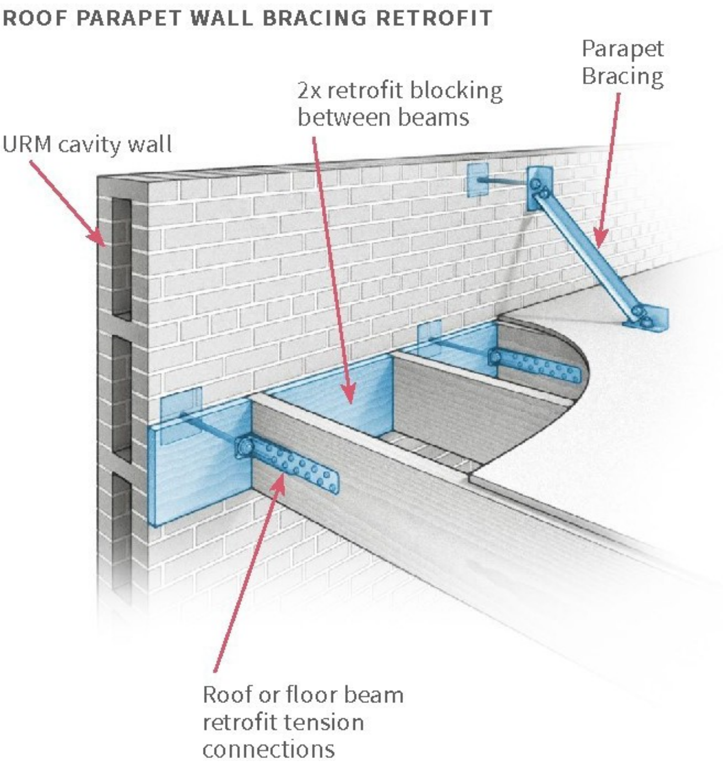

Figure 2 Caption: Parapet bracing and added tension ties to the roof/floor framing. FEMA P-530

Cost Impact: The code change proposal will increase the cost of construction

This proposal will increase the cost of construction by moving this provision within the main body of the IRC. However, this provision has been revised from the current Appendix AJ provision and is limited to SDC D2 only, applies only if roof work involves more than 25% of the roof area, and provides an exception for shorter more squat URM parapets.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: ~~**R606.12.4.3**~~ <u>**AJ108.4**</u> **Unreinforced Masonry Parapets.** Unreinforced masonry parapets located in Seismic Design Category D , shall have wall anchors installed at the roofline and bracing above the roofline whenever a reroofing permit is issued, and work involves removal of roofing materials from more than 25 percent of the roof area. Such masonry bracing and wall anchors shall be of an approved design, unless an evaluation demonstrates compliance of the existing bracing and anchorage. Exception: Bracing above the roof line shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.
Exception: Bracing above the roof line shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.

~~**R908.1.1 Structure.** Whenever a reroofing permit is issued for work done in Seismic Design Category D , parapets constructed of unreinforced masonry shall comply with R606.12.4.3.~~

Committee Reason: The committee determined that the modification correctly deletes the unnecessary Section R908.1.1 regarding reroofing permit is issued for work in Seismic Design Category D2 and relocated the new section to AJ108.4, which is appropriate. The committee decided that the proposal as modified aligns the unbraced masonry provisions of Appendix AJ with similar IEBC Section 503.6 (Vote: 10-0).

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., 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) requests As Modified by Public Comment

Further modify as follows:

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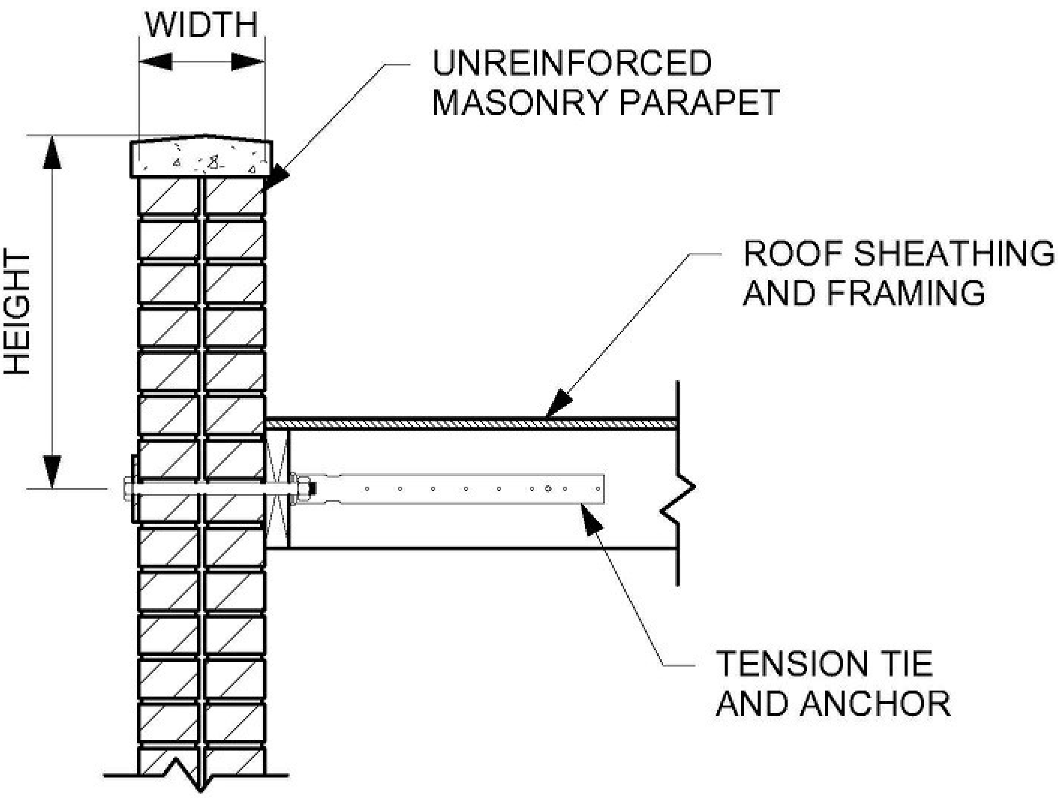
AJ108.4 Unreinforced Masonry Parapets. Unreinforced masonry parapets located in Seismic Design Category D_2, shall have wall anchors installed at the roofline and <u>additional</u> bracing <u>installed</u> above the roofline whenever a *reroofing permit* is issued, and work involves removal of roofing materials from more than 25 percent of the roof area. Such masonry bracing and wall anchors shall be of an *approved* design, unless an evaluation demonstrates compliance of the existing bracing and anchorage.

> **Exception:** Bracing above the roof line shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.

Commenter's Reason: This public comment addresses points of concern that were raised in testimony during the public action hearings. A new figure has been added to clarify how the height-to-width ratio should be determined.In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.
https://www.cdpaccess.com/p/public-comment/3133/27718/files/download/3699/FEMA-IRC%20APP%20J%20compiled%2007-21-22.pdf

This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7,

RB162, RB163, RB206, and RB297



Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This PC does not increase or decrease the cost from the approved as-modified proposal. This is a clarification only of the relative brace location descriptions. The current AJ108.4 requires bracing and anchorage for unreinforced masonry parapet walls ANYTIME a reroofing permit is required. The proposed language requires bracing and anchorage for unreinforced masonry parapets ONLY WHEN the reroofing area exceeds 25% and the height-to-width ratio is greater than 2.5. This is a common sense approach that allows small repairs and maintenance projects to be performed to the roof without triggering the provision.

Final Hearing Results	
RB206-22	AMPC1

RB207-22

Original Proposal

IRC: R609.1, R609.4.1

Proponents: Mike Fischer, Kellen, International Door Association (mfischer@kellencompany.com)

2021 International Residential Code

Revise as follows:

R609.1 General. This section prescribes performance and construction requirements for exterior windows, ~~and~~ doors,and garage doors installed in walls. Windows and doors shall be installed in accordance with the fenestration manufacturer's written instructions. Window and door openings shall be flashed in accordance with Section R703.4. Written installation instructions shall be provided by the fenestration manufacturer for each window or door.

R609.4 Garage doors. Garage doors shall be tested in accordance with either ASTM E330 or ANSI/DASMA 108, and shall meet the pass/failcriteria of ANSI/DASMA 108.

Revise as follows:

R609.4.1 Garage door labeling. Garage doors shall be *labeled* with a permanent *label* provided by the garage door manufacturer. The *label* shall identify the garage door manufacturer, the garage door model/series number, the positive and negative design wind pressure rating, the installation instruction drawing reference number, and the applicable test standard. Garage doors shall be installed in accordance with the manufacturer's installation instructions.

Reason: The proposal makes two changes. The first change in Section R609.1 is editorial; Section R609 includes provisions for exterior windows and doors, and also for garage doors. The proposed text includes garage doors within the scope of Section R609 to clarify the intent of the section.
The second proposed change is in R609.4.1 adds a requirement that garage doors be installed in accordance with the manufacturer's installation instructions. Note that R609.4 includes product testing requirements, and R609.4.1 includes labeling details with a reference to the "installation instruction drawing", but does not specifically state that the garage door be installed in accordance with the installation instructions. Those instructions often contain additional information regarding jamb attachments and anchoring and other details necessary to ensure proper installation and compliance with the intent of the code. The proposal clarifies the intent and is consistent with the provisions for exterior windows and doors in Section R609.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies the current expectation that tested garage doors be installed in accordance with the manufacturers installation instructions. It adds no new requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that it is appropriate for garage doors to follow the manufacturer's instructions and should be incorporated in Section R609.4.1, garage door labeling. The committee also agreed to clarify the intent of the code by adding garage doors within the scope of Section R609.1 (Vote: 9-1).

Final Hearing Results

RB207-22	AS

RB208-22

Original Proposal

IRC: R702.7, R702.7.1 (New)

Proponents: Theresa Weston, The Holt Weston Consultancy, Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. Vapor retarders shall be installed in accordance with Section R702.7.1 The climate zone shall be determined in accordance with Section N1101.7 .

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.

Add new text as follows:

R702.7.1 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 a component of a continuous air barrier, the vapor retarder shall be installed as an air barrier in accordance with Section N1102.4.1.1.

Reason: This proposal recognizes the challenge of materials that serve multiple functions. In addition to protection from condensation, vapor retarders may also function as a component in an air barrier assembly. This proposal seeks coordination of the installation of vapor retarders between Part III - Building Planning and Construction and Part IV -- Energy Conservation of the IRC in order to streamline the compliance with both sections. Vapor retarders are commonly installed as part of or in conjunction with an air barrier. Air leakage control is currently addressed within the I-codes based on energy efficiency considerations, but it also critical to the protection against moisture condensation.
This proposal correlates with a proposal that was approved for the IBC in Group A.

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 does not add new technical requirements, but rather coordinates between existing requirements in two Parts of the code. The coordination is to ensure that existing requirements are implemented in an effective manner.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R702.7.1 Vapor Retarder Installation. Vapor retarders shall be installed in accordance with the manufacturer's instructions, accepted installation methods 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 Section N1102.4.1.1.

Committee Reason: The committee decided that the modification allows the use of accepted installation methods for vapor retarders that do not have manufacturer's instructions. The committee approved this proposal, as modified, due to the fact that the proposal provides critical directions for vapor retarder installation. The committee recommended that the proponent looks into other terminologies to clarify the proposal's intent regarding "accepted installation methods" in the public comment phase (Vote: 6-4).

Final Hearing Results	
RB208-22	AM

RB209-22

Original Proposal

IRC: SECTION 202 (New), R702.7, TABLE R702.7(2), TABLE R702.7(3), TABLE R702.7(4), R702.7(5) (New), R702.7.2 (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Add new definition as follows:

RESPONSIVE VAPOR RETARDER. A vapor retarder material complying with a *vapor retarder class* of Class I or Class 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:

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. The climate zone shall be determined in accordance with Section N1101.7 .

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 shall not be required where the assembly complies with Table R702.7(5).

TABLE R702.7(1) VAPOR RETARDER MATERIALS AND CLASSES

CLASS	ACCEPTABLE MATERIALS
I	Sheet polyethylene, nonperforated aluminum foil or other approved materials with a perm rating less than or equal to 0.1.
II	Kraft-faced fiberglass batts, vapor retarder paint or other approved materials applied in accordance with the manufacturer's installation 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 installation instructions for a perm rating greater than 1.0 and less than or equal to 10.0.

TABLE R702.7(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	CLASS I[a]	CLASS II[a]	CLASS III
1, 2	Not Permitted	Not Permitted	Permitted
3, 4 (except Marine 4)	Not Permitted	Permitted[c]	Permitted
Marine 4, 5, 6, 7, 8	Permitted[b,c]	Permitted[c]	See Table R702.7(3)

a. 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.

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 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 R702.7(4) and the ClassI or 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)~~.

TABLE R702.7(3) CLASS III VAPOR RETARDERS

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
Marine 4	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 2.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 3.75 over 2 × 6 wall.
5	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
6	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 11.25 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 10 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 15 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 12.5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 20 over 2 × 6 wall.

a. Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, brick veneer with a clear airspace as specified in Table R703.8.4(1), rainscreen 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 Chapter 11.

TABLE R702.7(4) CONTINUOUS INSULATION WITH CLASS I OR II RESPONSIVE VAPOR RETARDER

CLIMATE ZONE	CLASS II VAPOR RETARDERSPERMITTED CONDITIONS FOR:[a]
3	Continuous insulation with *R*-value ≥ 2.
4, 5 and 6	Continuous insulation with *R*-value ≥ 3 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 5 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 10 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 Chapter 11.

Add new text as follows:

R702.7(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* exceed R-5, an *approved* design shall be required.

b. A water vapor control material layer having a permeance 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 in this table apply only to 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*.

R702.7.1 Spray foam plastic insulation for moisture control with Class II and III vapor retarders. For purposes of compliance with Tables R702.7(3) and R702.7(4), spray foam with a maximum permeance of 1.5 perms at the installed thickness applied to the interior 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. The spray foam *R*-value is equal to or greater than 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:

R702.7.2 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 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.

Reason: The purpose of this proposal is to coordinate the IRC vapor retarder provisions with incremental improvements made for the 2024 IBC vapor retarder provisions in the 2021 code as a result of FS138-21 approved as modified. The major improvements include:

1. inclusion of a definition for responsive vapor retarders and correlating changes to text to streamline use of the definition,

2. the ability to use Class I or II responsive vapor retarders with Table R702.7(4),

3. inclusion of a new exception and option (Table R702.7(5)) to control water vapor using exterior continuous insulation without an interior vapor retarder,

4. recognition of rainscreen systems as a vented cladding for use with Table R702.7(3), and

5. addition of a new subsection R702.7.2 for vapor retarder installation.

These changes will make the IBC and IRC consistent with the one exception being that the Class III vapor retarder provisions in Table R702.7(3) remain unchanged with regard to applying only to the Marine 4 climate zone and not all of Climate Zone 4 as in the 2021 and 2024 IBC. This difference was the result of a compromise made in the prior code development cycle for the IRC based on builder experience. Outside of that exception, all of the changes made are consistent with and expand on the original research and technical basis of the existing vapor retarder provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal coordinates with the 2024 IBC provisions by providing clarifications and additional options for compliance.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R702.7.2 Vapor retarder installation. Vapor retarders shall be installed in accordance with the manufacturer's instructions,accepted installation methods 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.~~ Section N1102.4.1.1.

Committee Reason: The committee decided that the modification clarifies the proposal and corrects the reference to Section N1102.4.1.1 (R402.4.1.1). The committee approved this proposal as modified due to the fact that the proposal coordinates the IRC vapor retarder provisions with 2024 IBC vapor retarder provisions. The proposal also clarifies vapor retarder installation by adding a new subsection, Section R702.7.2 (Vote: 8-2).

Final Hearing Results

RB209-22	AM

RB210-22

Original Proposal

IRC: TABLE R702.7(2)

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

TABLE R702.7(2) VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	CLASS I[a]	CLASS II[a]	CLASS III
1, 2	Not Permitted	Not Permitted	Permitted
3, 4 (except Marine 4)	Not Permitted	Permitted[c]	Permitted
Marine 4, 5, 6, 7, 8	Permitted[b]	Permitted[c]	See Table R702.7(3)

a. 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.

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.

c. Where a Class II vapor retarder is used in combination with foam plastic insulating sheathingor insulated siding installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table R702.7(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).

Reason: This is a simple change to include other forms of continuous insulation in this footnote in addition to insulated sheathing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply adds an option when this section of the code is applied.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal due to the fact that the proposal clarifies other forms of continuous insulation by adding insulated siding to table R702.7(2) vapor retarder options, footnote c (Vote: 9-0).

Final Hearing Results

RB210-22	AS

RB212-22

Original Proposal

IRC: R703.2

Proponents: Theresa Weston, The Holt Weston Consultancy, Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2021 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, 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 R703.1. Where the water-resistive barrier also functions as a component of a continuous air barrier, the water-resistive barrier shall be installed as an air barrier in accordance with Section N1102.4.1.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. ASTM E331 in accordance with Section R703.1.1.
4. Other approved materials 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: This proposal recognizes the challenge of materials that serve multiple functions. In many applications a water-resistive barrier also serves as a major component of an air barrier assembly. This proposal seeks coordination of installation of water-resistive barrier between Part III - Building Planning and Construction and Part IV -- Energy Conservation of the IRC in order to streamline the compliance with both sections.

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 only coordinates between existing requirements that are in different Parts of the code and does not add new technical requirements. The coordination is to ensure that existing requirements are implemented in an effective manner.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal simplified the application and coordinates of installation of the water-resistive barrier between Part III - Building Planning and Construction and Part IV - Energy Conservation of the IRC (Vote: 9-0).

Final Hearing Results

RB212-22	AS

RB213-22

Original Proposal

IRC: R703.2

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, 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 R703.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. Foam plastic insulating sheathing water-resistive barrier systems complying with Section R703.1.1 and installed in accordance with the manufacturer's installation instructions.

4. ~~3.~~ ASTM E331 in accordance with Section R703.1.1.

5. ~~4.~~ Other approved materials 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: This proposal coordinates the IRC language with the IBC 2024 language approved as submitted in accordance with proposal FS128-21. 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 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 felt, Grade D papers, and wraps per ASTM E2556). Section R703.1.1 is referenced because those performance criteria have been historically applied as the water-resistance requirements of foam sheathing WRB system – tested in an exposed condition on full-scale wall assemblies for qualification purposes. Installation in accordance with the 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 decided that the proposal recognizes foam sheathing as an approved WRB system when qualified for this application and installed in accordance with the manufacturer's instructions. The proposal also coordinates with group A approved requirements to the IBC (Vote: 9-0).

Final Hearing Results

RB213-22	AS

RB214-22

Original Proposal

IRC: R703.2

Proponents: Matthew Hunter, American Wood Council, Wood Manufacturing (mhunter@awc.org)

2021 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, 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 R703.1. Water-resistive barrier materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. ASTM E331 in accordance with Section R703.1.1.
4. Other approved materials 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).

Exception: A water-resistive barrier shall not be required in unconditioned detached tool sheds, storage sheds, playhouses, and other similar accessory structures provided all of the following requirements are met:

1. Exterior wall covering is limited to siding that is attached direct to studs.
2. Exterior walls are uninsulated.
3. Interior side of exterior walls has no wall covering or wall finishes.

Reason: This proposal takes into account feedback from prior code development cycles on the omission of water-resistive barriers (WRB) for detached accessory structures. For many years, the code exempted accessory structures from the requirement for a water-resistive barrier. The exception was removed in the 2018 code development cycle (RB284-16), but the exception that was removed applied to all accessory structures, regardless of their purpose and regardless of whether they were heated or cooled. Unconditioned detached accessory structures such as tool sheds and storage sheds with open stud construction have a proven record of performance when complying with the normal siding installation requirements without a water-resistive barrier. The Committee was split (6-4) in favor of a previous proposal (RB231-19) to reinstate the exemption of accessory structures from WRB requirement during the 2019 Group B cycle, bu there were objections raised during the Public Comment Hearings regarding the lack of requirements for open stud construction (i.e., no insulation, wall coverings, or wall finishes) on the inside of these structures to facilitate drying action from both sides of the wall. The three proposed exceptions are very clear as to when a WRB is not required. The permissible omission or the WRB does not waive requirements for WRB installation where WRB use is required by the siding manufacturer's installation instructions. Should an uninsulated, not fit for human occupancy tool shed, storage shed, playhouse, or other equipment shed be proposed to serve as a future tiny home or home office, compliance with all applicable building code provisions associated with that specific use and occupancy would be required. Please refer to Section R302 for use of terms detached tool sheds, storage sheds, and playhouses also used in this proposal to describe types of detached accessory structures.

Cost Impact: The code change proposal will decrease the cost of construction
The proposal clarifies where water-resistive barriers (WRB) may be omitted.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee decided that the proposal acknowledges common practice and provides limitations where water-resistive barriers (WRB) are not required. In addition, the proposal clarifies the requirements for unconditioned detached tool sheds, storage sheds, playhouses, and other similar accessory structures (Vote: 9-0).

Final Hearing Results

RB214-22	AS

RB215-22

Original Proposal

IRC: TABLE R703.3(1)

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

Portions of table not shown remain unchanged.

SIDING MATERIAL		NOMINAL THICKNESS (inches)	JOINT TREATMENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS: Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[l]	Direct to studs	Number or spacing of fasteners
Fiber cement siding	Panel siding (see Section R703.10.1)	$^{5}/_{16}$	Section R703.10.1	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	4d common ($1^{1}/_{2}$″ × 0.099″)	6″ panel edges 12″ inter. sup.
	Lap siding (see Section R703.10.2)	$^{5}/_{16}$	Section R703.10.2	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″) or 0.120" dia. (11 gage) roofing nail	Note f
Insulated vinyl siding[j, m]		0.035 (vinyl siding layer only)	Lap	0.120" nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h, i]	0.120" nail (shank) with a 0.313" head or 16- gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h]	0.120" nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h]	0.120" nail (shank) with a 0.313" head Section R703.11.2	Not allowed	16 inches on center or specified by manufacturer instructions, test report or other sections of this code
Vinyl siding[m] (see Section R703.11)		0.035	Lap	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h, i]	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$- inch crown[h]	0.120″ nail (shank) with a 0.313″ head or 16- gage staple with $^{3}/_{8}$- to $^{1}/_{2}$- inch crown[h]	0.120″ nail (shank) with a 0.313 head Section R703.11.2	Not allowed	16 inches on center or as specified by the manufacturer instructions or test report

For SI: 1 inch = 25.4 mm.

a. Aluminum nails shall be used to attach aluminum siding.

b. Aluminum (0.019 inch) shall be unbacked only where the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.

c. Shall be of approved type.

d. Where used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.

e. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.

f. Face nailing: one 6d common nail through the overlapping planks at each stud. Concealed nailing: one 11-gage0.120" diameter $1^{1}/_{2}$-inch-long galv. roofing nail through the top edge of each plank at each stud in accordance with the manufacturer's installation instructions.

g. Vertical joints, if staggered, shall be permitted to be away from studs if applied over wood structural panel sheathing.

h. Minimum fastener length must be sufficient to penetrate sheathing other nailable substrate and framing a total of a minimum of $1^{1}/_{4}$ inches or in accordance with the manufacturer's installation instructions.

i. Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.

j. Insulated vinyl siding shall comply with ASTM D7793.

k. Polypropylene siding shall comply with ASTM D7254.

l. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Sections R703.15, R703.16 and R703.17.

m. Fastener shall be aluminum, galvanized steel or stainless steel.

Reason: ASTM F1667 requires a decimal diameter to be indicated when gage is used as a nail diameter.
Staples shown in table did not have crown widths indicated. The Vinyl Siding Institute (VSI) standard provided the appropriate crown widths.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarified information already provided.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESSPortions of table and footnotes not shown remain unchanged.

SIDING MATERIAL	NOMINAL THICKNESS (inches)	JOINT TREATMENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
			Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Insulated vinyl siding[j, ~~m~~]	0.035 (vinyl siding layer only)	Lap	0.120 " nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h, i]	0.120" nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$ -inch crown[h]	0.120" nail (shank) with a 0.313" head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$ -inch crown[h]	0.120" nail (shank) with a 0.313" head Section R703.11.2	Not allowed	16 inches on center or specified by manufacturer instructions, test report or other sections of this code
Vinyl siding[~~m~~] (see Section R703.11)	0.035	Lap	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$-inch crown[h, i]	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$- inch crown[h]	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with $^{3}/_{8}$- to $^{1}/_{2}$- inch crown[h]	0.120″ nail (shank) with a 0.313 head Section R703.11.2	Not allowed	16 inches on center or as specified by the manufacturer instructions or test report

~~m Fastener shall be aluminum, galvanized steel or stainless steel.~~

Committee Reason: The committee concluded that the modification accurately deletes the unnecessary language in Table R703.3(1) footnote m for fastener shall be aluminum, galvanized steel, or stainless steel and from the vinyl siding in the table since it is already addressed in the code. The committee decided that the proposal as modified corrects the decimal diameter to be indicated when gage is used as a nail diameter based on ASTM F1667. The proposal also adds crown widths for staples in Table R703.3(1) (Vote: 10-0).

Final Hearing Results

RB215-22 AM

RB216-22

Original Proposal

IRC: R703.3.1 (New)
Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Add new text as follows:

R703.3.1 Siding clearance at wall and adjacent surfaces. Unless otherwise specified by the cladding manufacturer or this code, cladding shall have clearance of at least 6 inches (152 mm) from grade and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

Reason: This code contains various clearance between grade, slabs, and other horizontal surfaces. With siding there are several reasons to require this spacing including heat building up on horizontal surfaces, expansion and contraction issues that come along with certain sidings like polymeric siding, and moisture management issues. A 1/2" clearance will provide a good distance between materials and intersection surfaces/planes and 6" is consistent with specific codes requirements in R317.1, protection of wood products including wood siding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a common practice but worth noting in the code to ensure proper siding performance and moisture / heat issues.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R703.3.1 Siding clearance at wall and adjacent surfaces. Unless otherwise specified by the cladding manufacturer or this code, polypropylene, insulated vinyl, and vinyl claddings shall have clearance of at least 6 inches (152 mm) from grade and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

Committee Reason: The committee decided that the modification clarifies the materials for which the new Section R703.3.1 is applicable by adding polypropylene, insulated vinyl, and vinyl claddings. The committee approved the proposal as modified due to the fact that the proposal clarifies siding clearance at a wall and adjacent surfaces. In addition, the proposal clarifies the clearance from grade and from other adjacent surfaces (decks, roofs, slabs).
For the public comment phase, the committee encouraged the proponent to look into changing "grade" to "ground" and look into a better location for the section since Section R703.3 is for wall covering nominal thickness and attachments, which is not relevant to the new section (Vote: 10-0).

Public Comments

Public Comment 1

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

R703.3.1 Siding clearance at wall and adjacent surfaces. Unless otherwise specified by the cladding manufacturer or this code, polypropylene, insulated vinyl, and vinyl claddings shall have clearance of at least 6 inches (152 mm) from ~~grade~~the ground and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

Commenter's Reason: The committee suggested changing the term grade to ground, which is more appropriate here. Siding clearance from the ground should be 6", the term grade would more broadly apply inappropriately.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This PC does not change the intent of the original proposal. The PC corrects clarification of terms.

Final Hearing Results	
RB216-22	AMPC1

RB217-22

Original Proposal

IRC: R703.3.4

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.3.4 Minimum fastener length and penetration. Fasteners shall have the greater of the minimum length specified in Table R703.3(1) or as required to provide a minimum penetration into framing as follows:

1. Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, wood structural panel siding in accordance with ANSI/APA-PRP 210, fiber-cement panel siding and fiber-cement lap siding installed over foam plastic sheathing shall penetrate not less than $1^1/_2$ inches (38 mm) into framing or shall be in accordance with the manufacturer's installation instructions.
2. Fasteners for hardboard panel and lap siding shall penetrate not less than $1^1/_2$ inches (38 mm) into framing.
3. Fasteners for vinyl siding and insulated vinyl siding<u>shall be</u> installed <u>in accordance with Section R703.11 or R703.13</u>. ~~over wood or wood structural panel sheathing shall penetrate not less than 1¹/₄ inches (32 mm) into sheathing and framing combined. Vinyl siding and insulated vinyl siding shall be permitted to be installed with fasteners penetrating into or through wood or wood structural sheathing of minimum thickness as specified by the manufacturer's instructions or test report, with or without penetration into the framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend not less than ¹/₄ inch (6.4 mm) beyond the opposite face of the sheathing. Fasteners for vinyl siding and insulated vinyl siding installed over foam plastic sheathing shall be in accordance with Section R703.11.2. Fasteners for vinyl siding and insulated vinyl siding installed over fiberboard or gypsum sheathing shall penetrate not less than 1¹/₄ inches (32 mm) into framing.~~
4. <u>Fasteners for polypropylene siding shall be installed in accordance with Section R703.14</u>.

~~4.~~ <u>5.</u> Fasteners for vertical or horizontal wood siding shall penetrate not less than $1^1/_2$ inches (38 mm) into studs, studs and wood sheathing combined, or blocking.

~~5.~~ <u>6.</u> Fasteners for siding material installed over foam plastic sheathing shall have sufficient length to accommodate foam plastic sheathing thickness and to penetrate framing or sheathing and framing combined, as specified in Items 1 through 4.

Reason: This change shortens the code and points to the appropriate section for these two product categories for minimum fastener length and penetration. These same requirements are in the pointed to sections in the change.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple clean up and reduces code size!

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal removes unnecessary and redundant language. In addition, the proposal references the appropriate sections for fasteners for vinyl siding and fasteners for polypropylene siding (Vote: 10-0).

Final Hearing Results

RB217-22	AS

RB218-22

Original Proposal

IRC: R703.4

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.4 Flashing. *Approved* corrosion-resistant flashing shall be applied~~*shingle-fashion*~~ in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. <u>Overlapped flashing shall be applied in *shingle-fashion*.</u> Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall be installed in accordance with Section R703.4.1.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood *trim*.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Reason: "Shingle fashion" describes only one method of flashing. However, it is not the only method of installing flashing in a manner to prevent entry of water. For example, while adhered flexible flashing can be lapped shingle fashion and should be in cases where they are lapped, there are many applications where they rely on sealing to prevent water entry, including vertical seams, horizontal seams, and head seams (just as is the case with adhered joints in roofing membranes). In addition, fluid applied flashings are applied continuously to a joint, rely on sealing, and cannot be applied "shingle fashion". Therefore, this proposal distinguishes "shingle fashion" as a separate requirement where flashing is installed in an overlapping manner. The first sentence is revised by deleting "shingle fashion" so that it focuses on describing the performance intent of flashing in a non-exclusive manner irrespective of the type, material, or method of installation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal allows for flashing options and, consequently, may decrease the cost of construction or improve performance in some flashing applications.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee determined that the proposal provides performance guidance and separates the requirements for shingle-fashion where flashing is installed in an overlapping manner. In addition, in the first sentence of section R703.4, the deletion of the shingle fashion clarifies the performance intent of flashing in a non-exclusive manner irrespective of the type, material, or method of installation (Vote: 10-0).

Final Hearing Results	
RB218-22	AS

RB219-22

Original Proposal

IRC: R703.4.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.4.1 Flashing installation at exterior window and door openings . Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to a *water-resistive barrier* complying with Section 703.2 for subsequent drainage. Air sealing shall be installed around all window and door openings on the interior side of the rough opening gap. Mechanically attached flexible flashings shall comply with AAMA 712. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:

1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing or *water-resistive barrier* manufacturer's instructions. Where flashing instructions or details are not provided, *pan flashing* shall be installed at the sill of exterior window and door openings.*Pan flashing* shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using *pan flashing* shall incorporate flashing or protection at the head and sides.
2. In accordance with the flashing design or method of a*registered design professional*.
3. In accordance with other *approved* methods.

Reason: This proposal coordinates the IRC language with the IBC 2024 language approved as submitted in accordance with proposal FS145-21. 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. Currently, the WRB manufacturer is missing from Item 1 as a source for flashing installation instructions. This proposal is needed to ensure that all manufacturers, including the WRB manufacturer, have a means to communicate their flashing instructions for interfacing walls with windows and doors. This is needed because instructions from any one manufacturer may not include instructions for appropriate use of materials manufactured by others, but which is part of the overall flashing system.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds another important option for flashing instructions to be used where needed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal clarifies that all manufacturers, including the WRB manufacturers, need to communicate their flashing instructions for interfacing walls with windows and doors. The proposal also coordinates the IRC with the IBC group A approved change (Vote: 10-0).

Final Hearing Results

RB219-22 AS

RB220-22

Original Proposal

IRC: R703.6.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.6.1 Application. Wood shakes or shingles shall be applied either single course or double course over nominal $^{1}/_{2}$-inch (12.7 mm) wood-based sheathing or to furring strips over $^{1}/_{2}$-inch (12.7 mm) nominal nonwood sheathing. A *water-resistive barrier* shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened to the studs with minimum 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1. When installing shakes or shingles over a nonpermeable *water-resistive barrier*, furring strips shall be placed first vertically over the barrier and in addition, horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. Where installed over foam plastic *insulating sheathing*, furring attachments shall comply with Sections R703.15, R703.16, or R703.17. The spacing between adjacent shingles to allow for expansion shall be $^{1}/_{8}$ inch (3.2 mm) to $^{1}/_{4}$ inch (6.4 mm) apart, and between adjacent shakes shall be $^{3}/_{8}$ inch (9.5 mm) to $^{1}/_{2}$ inch (12.7 mm) apart. The offset spacing between joints in adjacent courses shall be not less than $1^{1}/_{2}$ inches (38 mm).

Reason: This proposal ensures that furring installed over foam sheathing complies with the attachment requirements found in other sections of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change requirements or cost, and ensures compliance with existing furring attachment requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved the proposal based on the fact that the proposal clarifies the requirements for furring installation over foam plastic insulating sheathing (Vote: 10-0).

Final Hearing Results

RB220-22 AS

RB221-22

Original Proposal

IRC: R703.6.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.6.1 Application. Wood shakes or shingles shall be applied either single course or double course over nominal $^1/_2$-inch (12.7 mm) wood-based sheathing or to furring strips over $^1/_2$-inch (12.7 mm) nominal nonwood sheathing. A*water-resistive barrier* shall be provided in accordance with Section R703.2 ~~over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm)~~. Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened to the studs with minimum 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1. When installing shakes or shingles over a nonpermeable *water-resistive barrier*, furring strips shall be placed first vertically over the *water-resistive barrier* and in addition, horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. The spacing between adjacent shingles to allow for expansion shall be $^1/_8$ inch (3.2 mm) to $^1/_4$ inch (6.4 mm) apart, and between adjacent shakes shall be $^3/_8$ inch (9.5 mm) to $^1/_2$ inch (12.7 mm) apart. The offset spacing between joints in adjacent courses shall be not less than $1^1/_2$ inches (38 mm).

Reason: This proposal is a clean-up to ensure WRB requirements and installation are based on Section R703.2 which more completely addresses the subject. This avoids redundant requirements in the code that can become out of sync. It also corrects the term "barrier" by replacing it with the defined term "water-resistive barrier".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal removes a redundancy and coordinates with existing requirements in the code for WRB installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal refers to section R703.2, water-resistive barrier, for the complete requirements. In addition, the proposal deletes the redundant text in section R703.6.1, Application, because the exact requirements are addressed in the referenced code section (Vote: 10-0).

Final Hearing Results

RB221-22	AS

RB222-22

Original Proposal

IRC: R703.6.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

R703.6.1 Application. Wood shakes or shingles shall be applied either single course or double course over nominal $^{1}/_{2}$-inch (12.7 mm) wood-based sheathing or to furring strips over $^{1}/_{2}$-inch (12.7 mm) nominal nonwood sheathing. A*water-resistive barrier* shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102 mm) and shall be fastened to the studs with minimum 7d or 8d box nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1. When installing shakes or shingles over a nonpermeable *water-resistive barrier*, furring strips shall be placed first vertically over the barrier and in addition, horizontal furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horizontal furring strips. <u>Alternatively, horizontal furring shall be gapped a minimum of 3/16-inch from the surface of the*water-resistive barrier* without the requirement for a vertical furring strip.</u> The spacing between adjacent shingles to allow for expansion shall be$^{1}/_{8}$ inch (3.2 mm) to $^{1}/_{4}$ inch (6.4 mm) apart, and between adjacent shakes shall be $^{3}/_{8}$ inch (9.5 mm) to $^{1}/_{2}$ inch (12.7 mm) apart. The offset spacing between joints in adjacent courses shall be not less than $1^{1}/_{2}$ inches (38 mm).

Reason: This proposal provides an alternative horizontal furring installation that provides a gap for drainage and ventilation for vertical furring installed over a nonpermeable water-resistive barrier. The minimum 3/16-in gap is consistent with minimum drainage and ventilation space provided for other claddings in moist and marine climate zones (e.g., see R703.7.3.3).

Cost Impact: The code change proposal will decrease the cost of construction
The proposal provides a means to maintain the intended drainage and back ventilation that is less costly and more easily constructed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal provides an alternative horizontal furring installation. The proposal clarifies the horizontal furring gap from the surface of the water-resistive barrier without the requirement for a vertical furring strip (Vote: 10-0).

Final Hearing Results

RB222-22	AS

RB223-22

Original Proposal

IRC: R703.6.3, ASTM Chapter 44
Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R703.6.3 Attachment. Wood shakes or shingles shall be installed according to this chapter and the manufacturer's instructions. Each shake or shingle shall be held in place by two stainless steel Type 304, Type 316 or hot-dipped zinc-coated galvanized corrosion-resistant box nails in accordance with Table R703.6.3(1) or R703.6.3(2). The hot-dipped zinc-coated galvanizing shall be in compliance with ASTM A153 Class Dor ASTM A641 Class 3S, 1.0 ounce per square foot . Alternatively, 16-gage stainless steel Type 304 or Type 316 staples with crown widths $^{7}/_{16}$ inch (11 mm) minimum, $^{3}/_{4}$ inch (19 mm) maximum, shall be used and the crown of the staple shall be placed parallel with the butt of the shake or the shingle. In single-course application, the fasteners shall be concealed by the course above and shall be driven approximately 1 inch (25 mm) above the butt line of the succeeding course and $^{3}/_{4}$ inch (19 mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two fasteners, driven approximately 2 inches (51 mm) above the butt line and $^{3}/_{4}$ inch (19 mm) from each edge. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shakes or shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shakes or shingles in accordance with AWPA U1 shall be stainless steel Type 316. The fasteners shall penetrate the sheathing or furring strips by not less than $^{1}/_{2}$ inch (13 mm) and shall not be overdriven. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M ~~09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: 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./ft². 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/ft².
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.

Bibliography: Referenced standard
ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples

ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Nails have been made by both methods for a very long time. This just formalizes what is/has been done and will not add cost to construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that updating the ASTM A641/A641M-2019 Specification for zinc-coated (Galvanized) carbon steel wire is necessary. In addition, Class 3S was added, which requires a minimum average coating weight of 1 oz/ft². Class 3S was added to ASTM A641 in 2019. The approval of this proposal is also consistent with the committee actions RB133-22 and RB177-22 (Vote: 9-0).

Final Hearing Results

RB223-22	AS

RB224-22

Original Proposal

IRC: R703.7.1
Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R703.7.1 Lath. Lath and lath attachments shall be of corrosion-resistant materials in accordance with ASTM C1063. Expanded metal, welded wire, or woven wire lath shall be attached to wood framing members or furring. Where the exterior plaster is serving as wall bracing in accordance with Table R602.10.4, the lath shall be attached directly to framing. The lath shall be attached with $1^1/_2$-inch-long (38 mm), 0.120 inch (3 mm) diameter (11-gage) nails having a $^7/_{16}$-inch (11.1 mm) head, or $^7/_8$-inch-long (22.2 mm), 16-gage staples, spaced not more than 7 inches (178 mm) on center along framing members or furring and not more than 24 inches (610 mm) on center between framing members or furring, or as otherwise *approved*. Additional fastening between wood framing members shall not be prohibited. Lath attachments to cold-formed steel framing or to masonry, stone, or concrete substrates shall be in accordance with ASTM C1063. Where lath is installed directly over foam sheathing, lath connections shall also be in accordance with Section R703.15, R703.16 or R703.17. Where lath is attached to furring installed over foam sheathing, the furring connections shall be in accordance with Section R703.15, R703.16 or R703.17.

Exception: Lath is not required over masonry, cast-in-place concrete, *precast concrete* or stone substrates prepared in accordance with ASTM C1063.

Reason: Multiple wire gage tables are in existence and sometimes conflict with one another. Because of this, ASTM F1667 was updated in 2017 with the requirement that when gage is used for a nail diameter, the equivalent decimal diameter is to also be indicated. This proposal addresses the F1667 requirement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only add clarity to the diameter requirement and will not change costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies the requirement that causes conflict between multiple wire gage tables. The added text is based on the updated ASTM F1667- 2017. ASTM F1667 requires when gage is used for a nail diameter; the equivalent decimal diameter is to be indicated (Vote: 9-0).

Final Hearing Results

RB224-22	AS

RB226-22

Original Proposal

IRC: R703.8.2.2, FIGURE R703.8.2.2, FIGURE R703.8.2.2(2) (New)

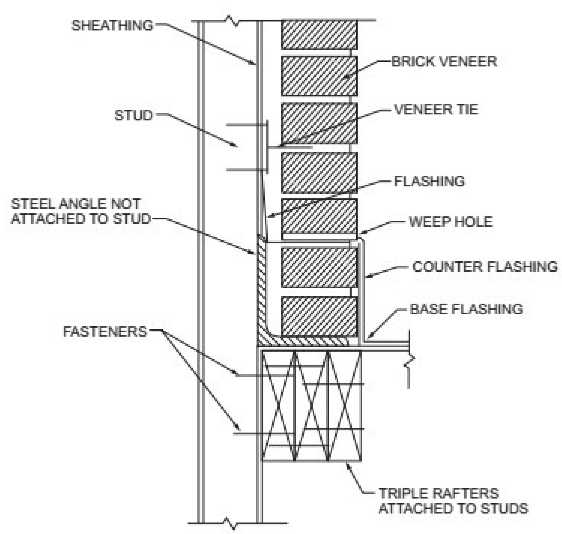
Proponents: Charles Clark Jr, Brick Industry Association, Brick Industry Association (cclark@bia.org)

2021 International Residential Code

Revise as follows:

R703.8.2.2 Support by ledger or roof construction. A steel angle shall be placed directly on top of theledger or roof construction. The ledger or roof ~~supporting~~ construction ~~for~~ supporting the steel angle shall consist of not fewer than three 2-inch by 6-inch (51 mm by 152 mm) wood members for wood construction or three 550S162 cold-formed steel members for cold-formed steel light frame construction. ~~A~~ The wood member abutting the vertical wall stud construction shall be anchored with not fewer than three$^{5}/_{8}$-inch (15.9 mm) diameter by 5-inch (127 mm) lag screws to every wood stud spacing. Each additional wood roof member shall be anchored by the use of two 10d nails at every wood stud spacing. A cold-formed steel member abutting the vertical wall stud shall be anchored with not fewer than nine No. 8 screws to every cold-formed steel stud. Each additional cold-formed steel roof member shall be anchored to the adjoining roof member using two No. 8 screws at every stud spacing. Not less than two-thirds the width of the masonry veneer thickness shall bear on the steel angle. Flashing and weep holes shall be located in the masonry veneer wythe in accordance with Figure R703.8.2.2(1) or Figure R703.8.2.2(2). The maximum height of the masonry veneer above the steel angle support shall be 12 feet 8 inches (3861 mm). The airspace separating the masonry veneer from the wood backing shall be in accordance with Sections R703.8.4 and R703.8.4.2. The support for the masonry veneer shall be constructed in accordance with Figure R703.8.2.2(1) or Figure R703.8.2.2(2).

The maximum slope of ~~the~~ a steel angle installed ~~roof construction~~ without stops shall be 7:12. A steel angle installed ~~Roof construction~~ with a slope~~s~~ greater than 7:12 but not more than 12:12 shall have stops of a minimum 3-inch by 3-inch by$^{1}/_{4}$-inch (76 mm by 76 mm by 6.4 mm) steel plate welded to the angle at 24 inches (610 mm) on center along the angle or as *approved* by the *building official*.



SUPPORT BY ROOF MEMBERS

FIGURE R703.8.2.2(1) EXTERIOR MASONRY VENEER SUPPORT BY ROOF MEMBERS

Add new text as follows:

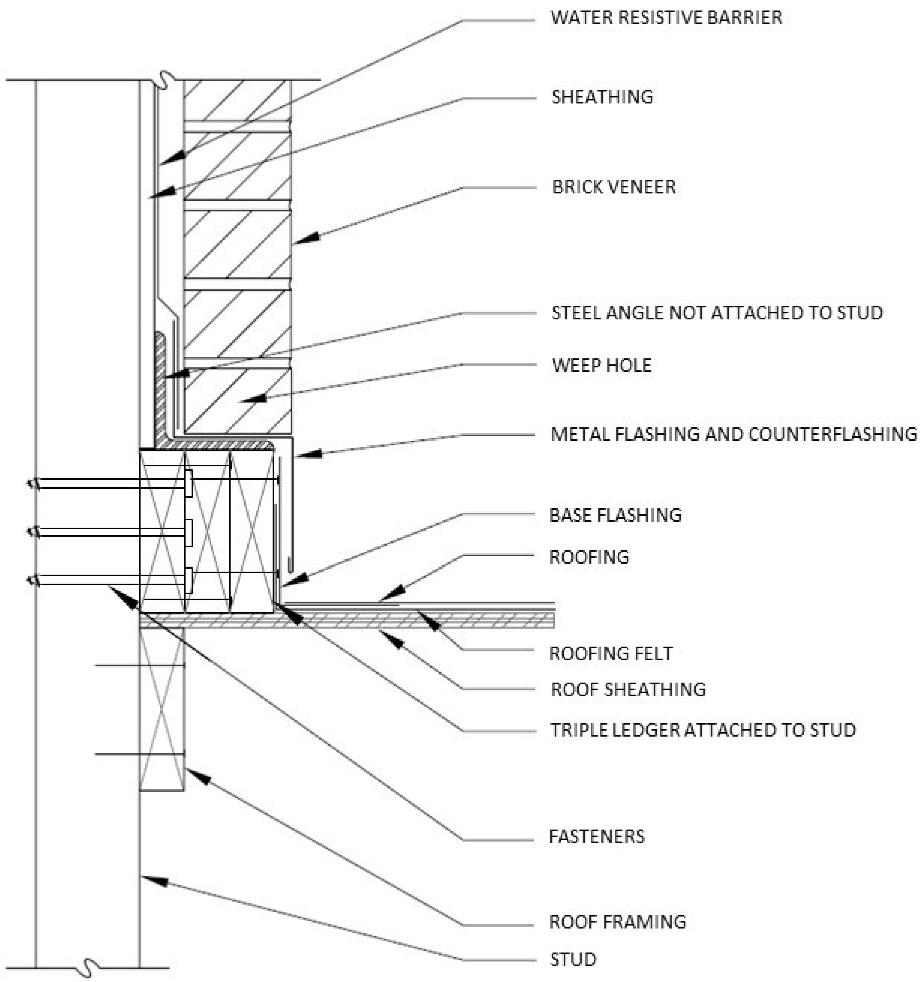


FIGURE R703.8.2.2(2) EXTERIOR MASONRY VENEER SUPPORT BY LEDGER

<u>FIGURE R703.8.2.2(2) EXTERIOR MASONRY VENEER SUPPORT BY LEDGER</u>

Reason: This code change proposal provides an option for placing a triple ledger above the roof construction instead of within the roof construction. As a result, one continuous piece of flashing can be installed between the top of the steel angle and the bottom of the veneer instead of multiple pieces of step flashing between the masonry veneer courses such that it follows the slope of the roof. Doing so simplifies the installation of the flashing and the masonry veneer.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will decrease the cost of construction by simplifying the laying of the masonry veneer by allowing one continuous piece of flashing to be installed instead of multiple pieces of step flashing. This allows the construction of the masonry veneer to proceed at a quicker pace resulting in a reduction in cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal because the proposal simplifies the laying of the masonry veneer by allowing one continuous piece of flashing to be installed instead of multiple pieces of step flashing (Vote: 8-2).

Final Hearing Results

RB226-22	AS

RB227-22

Original Proposal

IRC: TABLE R703.8.3.1

Proponents: Charles Clark Jr, Brick Industry Association, Brick Industry Association (cclark@bia.org)

2021 International Residential Code

Revise as follows:

TABLE R703.8.3.1 ALLOWABLE SPANS FOR LINTELS SUPPORTING MASONRY VENEER[a, b, c, d]

Portions of table not shown remain unchanged.

SIZE OF STEEL ANGLE[a, c, d] (inches)	NO STORY ABOVE	ONE STORY ABOVE	TWO STORIES ABOVE	NO. OF $^{1}/_{2}$-INCH OR EQUIVALENT REINFORCING BARS IN REINFORCED LINTEL[b, d]
5 x 3 x 5/16 or 5 × 3$^{1}/_{2}$ × $^{5}/_{16}$	10′-0″	8′-0″	6′-0″	2
6 × 3$^{1}/_{2}$ × $^{5}/_{16}$ or 5 x 3 x 5/16 with 2-9 gauge wires between first and second course	14′-0″	9′-6″	7′-0″	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Long leg of the angle shall be placed in a vertical position.

b. Depth of reinforced lintels shall be not less than 8 inches and all cells of hollow masonry lintels shall be grouted solid. Reinforcing bars shall extend not less than 8 inches into the support.

c. Steel members indicated are adequate typical examples; other steel members meeting structural design requirements shall be permitted to be used.

d. Use either ~~Either~~ steel angle or reinforced lintel ~~shall~~ to span opening.

Reason: This code change proposal provides steel angle lintel sizes for brick veneer made of nominal 3-inch wide masonry units such as queen-size and king-size brick. This change is needed as more and more residential masonry veneer is constructed with queen-size and king size brick. Rational analysis was used to determine the proposed spans. The analysis indicated that a 5 x 3 x 5/16 would be adequate to support a nominal 4-inch thick veneer as well as one which was nominally 3-inches thick. The slightly longer horizontal leg of the 5 x 3-1/2 x 5/16 does not significantly increase the angle's moment capacity nor significantly limit the angle's deflection for this particular application.

This proposal also clarifies Footnote d to better convey its intent.

Cost Impact: The code change proposal will decrease the cost of construction

The code change proposal WILL NOT increase the cost of construction. For brick veneers constructed of queen-size or king-size brick, it may decrease the cost of construction as less steel is required to span an opening of a given size.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal provides good clarification for steel angle lintel sizes for brick veneer made of nominal 3-inch wide masonry units (Vote: 10-0).

Final Hearing Results

RB227-22	AS

RB228-22

Original Proposal

IRC: R703.11, R703.13, R703.14, R902.2

Proponents: Sara Krompholz, Vinyl Siding Institute (VSI), Vinyl Siding Institute (VSI) (skrompholz@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.11 Vinyl siding. Vinyl siding shall be certified and *labeled* as conforming to the requirements of ASTM D3679 by an*approved* ~~quality control~~ agency.

R703.13 Insulated vinyl siding. *Insulated vinyl siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7793 by an *approved* ~~quality control~~ agency.

R703.14 Polypropylene siding. *Polypropylene siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7254, and those of Section R703.14.2 or Section R703.14.3, by an *approved* ~~quality control~~ agency.

R902.2 Fire-retardant-treated shingles and shakes. Fire-retardant-treated wood shakes and shingles shall be treated by impregnation with chemicals by the full-cell vacuum-pressure process, in accordance with AWPA C1. Each bundle shall be marked to identify the manufactured unit and the manufacturer, and shall be *labeled* to identify the classification of the material in accordance with the testing required in Section R902.1, the treating company and the ~~quality control~~ <u>approved</u> agency.

Reason: This is a simple change to make the correct reference to the defined term "approved agency". The term "quality control" is not correct nor defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply an edit to correct a defined term in the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee decided that the proposal corrects the existing code text by replacing "quality control" with "approved". The term "approved agency" is a defined term in the code, while "quality control agency" is not (Vote: 10-0).

Final Hearing Results

RB228-22	AS

RB229-22

Original Proposal

IRC: R703.11.1, R703.11.1.1, R703.11.1.2, R703.11.1.3

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.11.1 Installation. Vinyl siding, ~~soffit~~*insulated vinyl siding*, and accessories shall be installed in accordance with the*manufacturer's installation instructions*.

R703.11.1.1 Fasteners. Unless specified otherwise by the manufacturer's instructions, fasteners for vinyl siding shall be 0.120-inch (3 mm) shank diameter nail with a 0.313-inch (8 mm) head or 16-gage staple with a $^{3}/_{8}$-inch (9.5 mm) to $^{1}/_{2}$-inch (12.7 mm) crown or in accordance with Table R703.3(1).

R703.11.1.2 Penetration depth. Unless specified otherwise by the manufacturer's instructions or in accordance with Table R703.3(1), fasteners shall penetrate into building framing. The total penetration into sheathing, furring, framing or other *nailable substrate* shall be a minimum 1$^{1}/_{4}$ inches (32 mm). ~~Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other *nailable substrate* of minimum thickness specified by the instructions or test report without penetrating into framing. Where the fastener penetrates fully through the sheathing, the end of the fastener shall extend a minimum of $^{1}/_{4}$ inch (6.4 mm) beyond the opposite face of the sheathing or*nailable substrate*.~~

R703.11.1.3 Spacing. Unless specified otherwise by the manufacturer's instructions, the maximum spacing between fasteners for horizontal siding shall be 16 inches (406 mm), and for vertical siding 12 inches (305 mm)~~ both horizontally and vertically~~. Where specified by the manufacturer's instructions and supported by a test report, 24 inches (610 mm) ~~greater~~ fastener spacing is permitted.

Reason: This change is a clean-up and will help to understand what is necessary should alternative fastening like 24" oc become necessary. It also points to alternative fasteners in table R703.3.3 which is helpful to use when hitting studs becomes difficult. Finally, it brings in installation provisions for insulated vinyl siding as it is the same as vinyl siding.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is editorial clean up and also offers alternative installation techniques as an option.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R703.11.1.3 Spacing. Unless specified otherwise by the manufacturer's instructions, the maximum spacing between fasteners for horizontal siding shall be 16 inches (406 mm), and for vertical siding 12 inches (305 mm). Where specified by the manufacturer's instructions and supported by a test report, as alternative fastener spacing such 24 inches (610 mm) fastener spacing is permitted.

Committee Reason: The committee concluded that the modification provides details for referencing alternative fastener spacing. The committee determined that the proposal, as modified, clarifies the installation requirements and replaces "soffit" with "insulated vinyl siding". In addition, the proposal clarifies that 24 inches (610 mm) fastener spacing is permitted, where specified by the manufacturer's instructions and supported by a test report (Vote: 10-0).

Final Hearing Results	
RB229-22	AM

RB230-22

Original Proposal

IRC: R703.11.1, R703.11.1.1 (New), Figure R703.11.1.1 (1) (New), R703.11.1.2 (New), Figure R703.11.1.2 (1) (New), Figure R703.11.1.2 (2) (New), R703.13.1

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org); Glenn Overcash, AECOM, Federal Emergency Management Agency (glenn.overcash@aecom.com); Pataya Scott, Federal Emergency Management Agency (pataya.scott@fema.dhs.gov)

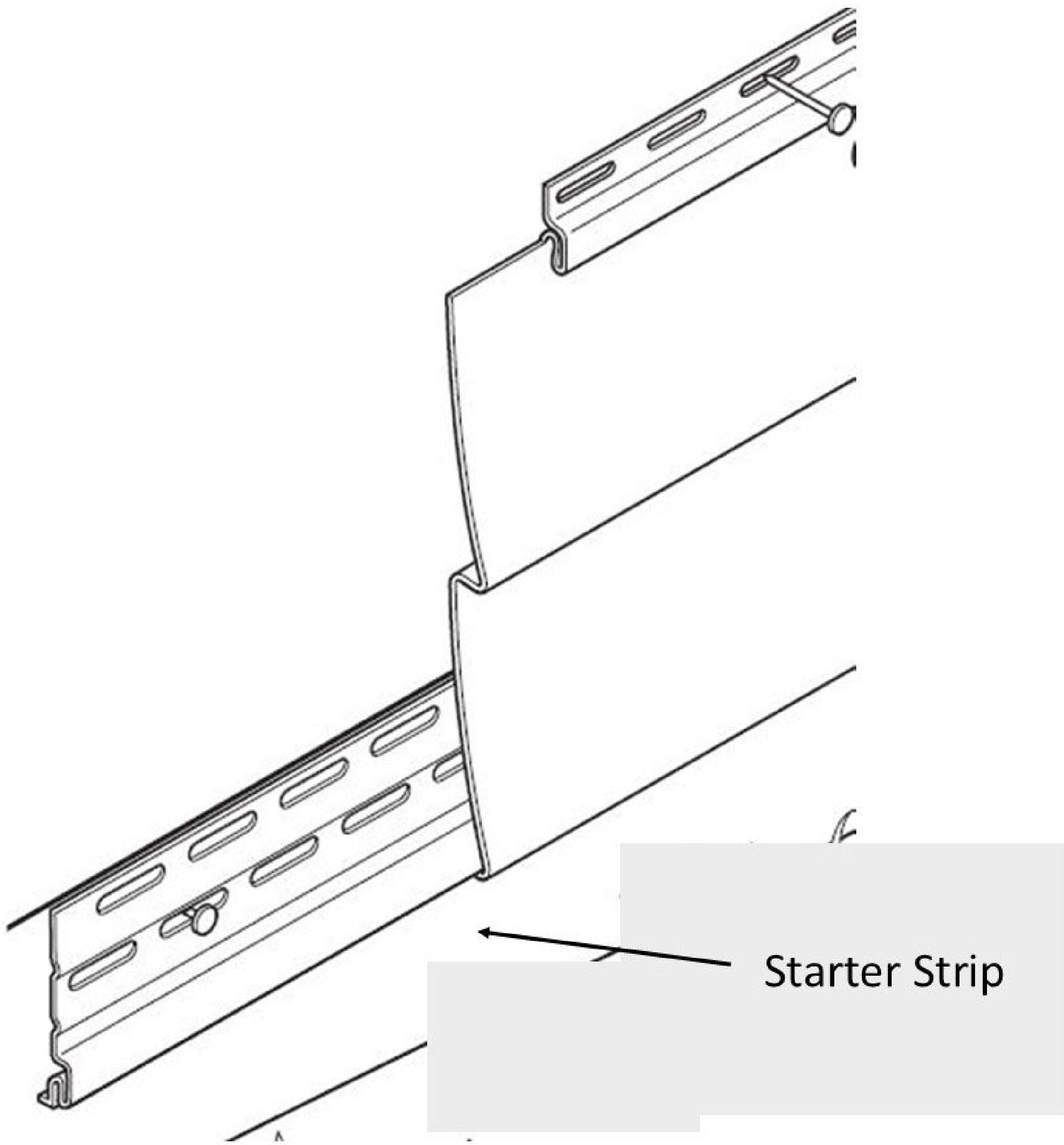
2021 International Residential Code

Revise as follows:

R703.11.1 Installation. Vinyl siding, ~~soffit~~insulated vinyl siding, and compatible accessories shall be installed in accordance with the *manufacturer's installation instructions.*

Add new text as follows:

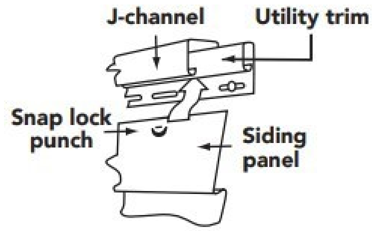
R703.11.1.1 Starter Strip. The first course of horizontal siding shall be secured using a starter strip as specified in the manufacturer's installation instructions. See Figure R703.1.1 (1).



a. Figure R703.11.1.1(1) illustrates typical installation details. See manufacturer's installation instructions for actual installation details.

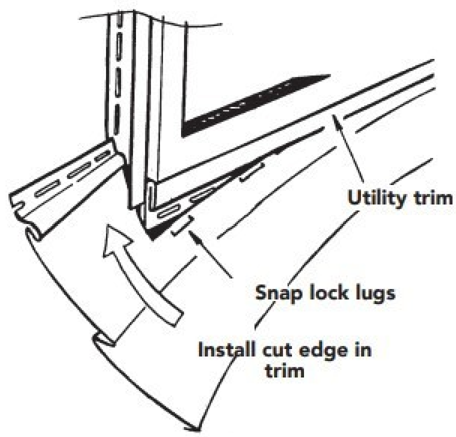
Figure R703.11.1.1 (1) Typical Starter Strip[a]

R703.11.1.2 Utility Trim. Where horizontal siding has to be cut or trimmed below windows and at the top of walls, the top edge of the siding shall be secured with utility trim and snap locks or as specified by the manufacturer's installation instructions. See Figures R703.11.1.2 (1) and R703.11.1.2 (2).



a. Figure R703.11.2.(1) illustrates typical installation details. See manufacturer's installation instructions for actual installation details.

Figure R703.11.1.2 (1) Typical Snap Lock & Utility Trim[a]



a. Figure R703.11.1.2(2) illustrates typical installation details. See manufacturer's installation instructions for actual installation details

Figure R703.11.1.2 (2) Typical Snap Lock & Utility Trim Under Window[a]

Revise as follows:

R703.13.1 Insulated vinyl siding and accessories. *Insulated vinyl siding* and compatible accessories shall be installed in accordance with Sections R703.11.1, R703.11.2, and the *manufacturer's installation instructions*.

Reason: This code change proposal provides requirements for starter strips and utility trim, two critical installation elements for vinyl siding, insulated vinyl siding, and polypropylene siding that are sometime ignored by installers. Including these provisions will help to ensure proper installation. Starter strips and utility trim are important to highlight as they are part of the wind performance system, and when omitted or installed incorrectly, have resulted in product performance failure in high wind events. The proposed requirements reflect standard installation procedures for horizontal polymeric cladding.

As part of the response to Hurricane Irma 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 and supporting observations are included in FEMA P-2023, Hurricane Irma in Florida MAT Report (https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-irma_florida.pdf). The Hurricane Irma in Florida MAT observed evidence of inadequate resistance to wind pressures for certain wall coverings of residential buildings (Conclusion FL11). In particular, failure of vinyl siding on residential structures was widespread. The MAT observed several instances of vinyl siding wind damage on buildings that appeared to have been due to installation issues addressed in this code change proposal. The image below (FL MAT Report Figure 4-28) shows a Marathon Key duplex building (built 2017) with vinyl siding loss across the front and left exterior walls. Vinyl siding loss inside the red outline (above the front porch) appears to have been initiated where a J-channel was installed instead of the manufacturer's specified starter strip.

The Marathon Key house shown in the image below (FL MAT Report Figure 4-29) was permitted to have its vinyl siding replaced in 2015, with work completed in 2016. As shown in the red outline, the house appeared to lack utility trim under the window where siding was lost. Notably, the estimated maximum wind speed on Marathon Key during Hurricane Irma was 120 mph, so within the wind limitations of the IRC.

Vinyl Siding Institute (VSI) conducted several recent post-hurricane analyses and noted the need to have these requirements added to the IRC to avoid future cladding system failures. An example showing failure from Hurricane Irma that resulted from improper installation is shown below. 

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed requirements are standard practices that are sometimes neglected during construction, so this code change should not affect cost.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R703.11.1.1 Starter Strip. The first course of horizontal siding shall be secured using a starter strip as specified in the manufacturer's installation instructions. See Figure R703.1.1 (1).
<u>Where the first course of siding has to be cut or trimmed, the bottom edge shall be secured with utility trim and snap locks as specified by the manufacturer's installation instructions.</u>

Committee Reason: The committee decided that the modification would improve the proposed text by adding the method to secure the bottom course of vinyl siding. Based on several recent post-hurricane analyses, the committee concluded that the proposal as modified is necessary to avoid future cladding system failures. There was disagreement with adding "manufacturer's instructions" again when it is already in both 703.11.1 and in Chapter 1. (Vote: 7-3).

Final Hearing Results

RB230-22 AM

RB232-22

Original Proposal

IRC: R703.14.1.1, R703.14.1.1.1 (New), R703.14.1.1.2 (New), Figure R703.14.1.1.2 (1) (New), R703.14.1.2

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Revise as follows:

R703.14.1.1 Installation. Unless otherwise specified in the *manufacturer's installation instructions*, *polypropylene siding* 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*~~, composed of wood or wood-based material and fasteners having equivalent withdrawal resistance~~. Accessories shall be installed in accordance with the *manufacturer's installation instructions.*

Add new text as follows:

R703.14.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location.

R703.14.1.1.2 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 as shown in Figure R703.14.1.1.2 (1).

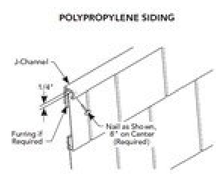


Figure R703.14.1.1.2 (1) Trim Under Window and Top of Walls Polypropylene Siding

Revise as follows:

R703.14.1.2 Fastener requirements. Unless otherwise specified in the ~~approved~~ *manufacturer's installation 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*. ~~Staples are not permitted.~~ Spacing of fasteners shall be installed in accordance with the *manufacturer's installation instructions.*

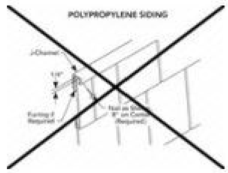
Reason: This change cleans up the section on polypropylene siding. This type of siding is unique in that it has varying installation spacing for fasteners and because of the must be installed over some type of nailble substrate sheathing as defined by the code. In some cases the product can be installed using staples, with proper testing information so that prohibition should be removed. It is also important the installation instructions be referenced be because of the unique panel sizes with each manufacturer.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are editorial and also adds standard installation practices.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R703.14.1.1.1 Starter Strip. Horizontal siding shall be installed with a starter strip at the initial course at any location. Where installation of a starter strip is not possible other approved equivalent shall be permitted.



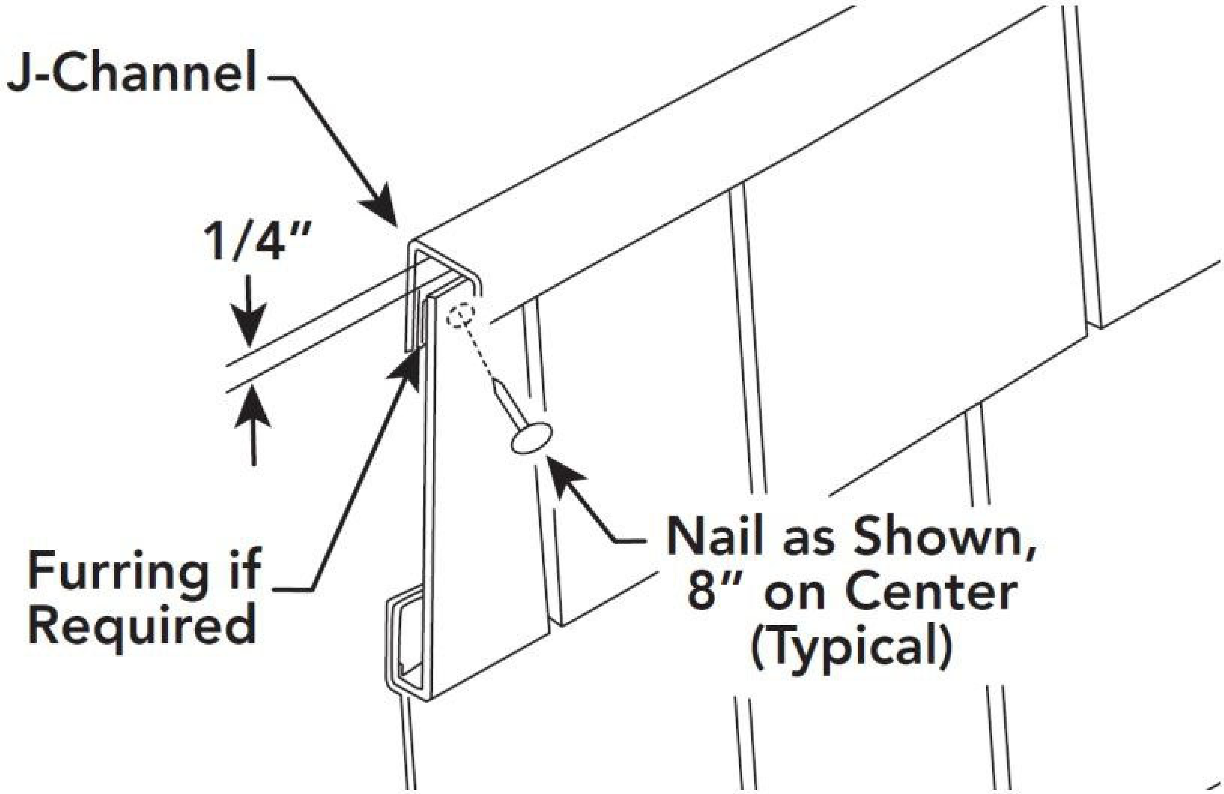


Figure R703.14.1.1.2 (1) Typical Trim Under Window and Top of Walls Polypropylene Siding

Committee Reason: The committee determined that the modification clarifies the requirements and improves the understanding of the figure. The committee decided that the proposal, as modified, provides code guidance for polypropylene siding installation spacing for fasteners. The proposal also references different manufacturers' installation instructions (Vote: 9-1).

Final Hearing Results

RB232-22	AM

RB233-22

Original Proposal

IRC: TABLE R703.15.1, TABLE R703.15.2

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Philip Line, American Wood Council, American Wood Council (pline@awc.org)

2021 International Residential Code

Revise as follows:

TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER MINIMUM PENETRATION INTO WOOD WALL FRAMINGTHROUGH FOAM SHEATHING[b]	CLADDING FASTENER TYPE AND MINIMUM SIZE[c]	CLADDING FASTENER VERTICAL SPACING[d] (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[~~d~~e] (inches)									
			16″ o.c. Fastener Horizontal Spacing					24″ o.c. Fastener Horizontal Spacing				
			Cladding Weight[f]~~:~~					Cladding Weight[f]~~:~~				
			3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf
Wood framing (minimum 1 1/4-inch penetration)	0.113″ diameter nail	6	2.00	1.45	1.00	0.75	DR	2.00	0.85	0.55	DR	DR
		8	2.00	1.00	0.65	DR	DR	2.00	0.55	DR	DR	DR
		12	2.00	0.55	DR	DR	DR	1.85	DR	DR	DR	DR
	0.120″ diameternail	6	3.00	1.70	1.15	0.90	0.55	3.00	1.05	0.65	0.50	DR
		8	3.00	1.20	0.80	0.60	DR	3.00	0.70	DR	DR	DR
		12	3.00	0.70	DR	DR	DR	2.15	DR	DR	DR	DR
	0.131″ diameter nail	6	4.00	2.15	1.50	1.20	0.75	4.00	1.35	0.90	0.70	DR
		8	4.00	1.55	1.05	0.80	DR	4.00	0.90	0.55	DR	DR
		12	4.00	0.90	0.55	DR	DR	2.70	0.50	DR	DR	DR
	0.162″ diameter nail	6	4.00	3.55	2.50	2.05	1.40	4.00	2.25	1.55	1.25	0.80
		8	4.00	2.55	1.80	1.45	0.95	4.00	1.60	1.10	0.85	0.50
		12	4.00	1.60	1.10	0.85	0.50	4.00	0.95	0.60	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 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 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. For cladding connections to wood structural panels, refer to Table R703.3.3. For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2).

c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

d. Fastener vertical spacing is an average spacing associated with the following nail count per foot: 6 inch spacing is associated with 2 nails per foot, 8 inch spacing is associated with 1.5 nails per foot, and 12 inch spacing is associated with 1 nail per foot.

~~d.~~e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

f. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional 3-coat stucco of not more than 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

TABLE R703.15.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

Portions of table not shown remain unchanged.

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[e](inches)									
					16" o.c. Furring[f]					24" o.c. Furring[f]				
					Siding Weight:[g]					Siding Weight:[g]				
					3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

g. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional 3-coat stucco of not more than 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

Reason: This proposal is a clarification of three items related to proper application of the Table R703.15.1 requirements. First, the column heading for minimum fastener penetration is revised to clearly indicate its focus on minimum fastener penetration into wood framing. Second, a new footnote 'd' is added to clarify application of prescribed vertical spacing requirements for cladding fasteners. Third, a new footnote 'f' is added to clarify application of the cladding weight categories used in the table. These clarifications are based on field experience, questions, and feedback in the use of the tables. For Table R703.15.2, the addition of footnote 'g' is proposed to clarify weight categories consistent with the revision proposed for Table R703.15.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification and has no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides clarity to the tables on technical details for cladding fastener requirements over foam plastic sheathing and support cladding weight. Addition of footnote d clarifies the application of prescribed vertical spacing requirements for cladding fasteners and footnote f for cladding weight categories. The committee suggested that the proponent looks into removing "not more than" in footnote f during the public comment phase (Vote: 9-1).

Public Comments

Public Comment 1

Proponents: Jay Crandell, ABTG / ARES Consulting, P.E., ABTG / ARES Consulting (jcrandell@aresconsulting.biz) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER MINIMUM PENETRATION INTO WOOD WALL FRAMING[b]	CLADDING FASTENER TYPE AND MINIMUM SIZE[c]	CLADDING FASTENER VERTICAL SPACING[d] (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[e] (inches)									
			16″ o.c. Fastener Horizontal Spacing					24″ o.c. Fastener Horizontal Spacing				
			Cladding Weight[f]:					Cladding Weight[f]:				
			3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf
$1^{1}/_{4}$-inch	0.113″ diameter nail	6	2.00	1.45	1.00	0.75	DR	2.00	0.85	0.55	DR	DR
		8	2.00	1.00	0.65	DR	DR	2.00	0.55	DR	DR	DR
		12	2.00	0.55	DR	DR	DR	1.85	DR	DR	DR	DR
	0.120″ diameternail	6	3.00	1.70	1.15	0.90	0.55	3.00	1.05	0.65	0.50	DR
		8	3.00	1.20	0.80	0.60	DR	3.00	0.70	DR	DR	DR
		12	3.00	0.70	DR	DR	DR	2.15	DR	DR	DR	DR
	0.131″ diameter nail	6	4.00	2.15	1.50	1.20	0.75	4.00	1.35	0.90	0.70	DR
		8	4.00	1.55	1.05	0.80	DR	4.00	0.90	0.55	DR	DR
		12	4.00	0.90	0.55	DR	DR	2.70	0.50	DR	DR	DR
	0.162″ diameter nail	6	4.00	3.55	2.50	2.05	1.40	4.00	2.25	1.55	1.25	0.80
		8	4.00	2.55	1.80	1.45	0.95	4.00	1.60	1.10	0.85	0.50
		12	4.00	1.60	1.10	0.85	0.50	4.00	0.95	0.60	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 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 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. For cladding connections to wood structural panels, refer to Table R703.3.3. For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2).

c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

d. Fastener vertical spacing is an average spacing associated with the following nail count per foot: 6 inch spacing is associated with 2 nails per foot, 8 inch spacing is associated with 1.5 nails per foot, and 12 inch spacing is associated with 1 nail per foot.

e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

f. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional 3-coat stucco of ~~not more than~~ 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

TABLE R703.15.2 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[e](inches)									
					16″ o.c. Furring[f]					24″ o.c. Furring[f]				
					Siding Weight:[g]					Siding Weight:[g]				
					3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

g. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional 3-coat stucco of ~~not more than~~ 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

Commenter's Reason: While voting in support of this proposal, two committee members and the committee reason statement indicate a recommendation to delete "not more than" in reference to thickness of 3-coat stucco mentioned in footnotes f and g of the two tables. The footnote is a statement defining table assumptions or examples regarding cladding weight categories used in the table, and is not meant to be taken without reasonable tolerance.

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 change requirements and only clarifies wording to allow for tolerance on nominal thickness categories of stucco.

Final Hearing Results

RB233-22	AMPC1

RB234-22

Original Proposal

IRC: TABLE R703.16.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

Revise as follows:

TABLE R703.16.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. 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. Where cladding is attached to wood structural panel sheathing only, fastening requirements shall be in accordance with Table R703.3.3. <u>For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2)</u>.

c. Screws shall comply with the requirements of ASTM C1513.

d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

Reason: This proposal coordinates reference to brick veneer tie connection requirements when fastened to wood structural panels. This provision is already included in footnote 'b' of Table R703.15.1 but was overlooked in the same footnote for Table R703.16.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal may reduce cost by clarifying that attachment of brick ties to wood structural panels on steel frame wall assemblies is permitted, just as it is permitted for wood frame wall assemblies with wood structural panels.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal clarifies the attachment of brick ties to wood structural panels on steel frame wall assemblies. The committee also agreed with the pointer to Table R703.8.4(2) for brick veneer tie connections to wood structural panels (Vote: 10-0).

Final Hearing Results

RB234-22	AS

RB235-22

Original Proposal

IRC: R703.18 (New)

Proponents: Michael Gardner, M Gardner Services, LLC, National Gypsum Company (michael@mgardnerservices.com)

2021 International Residential Code

Add new text as follows:

R703.18 Fiber-mat reinforced cementitious backer units. Fiber-mat reinforced cementitious backer units used on exterior walls as a substrate for the application of exterior finish materials shall comply with ASTM C1325. Installation shall be in accordance with manufacturer's installation instructions. Backer units shall be installed using corrosion-resistant fasteners. Finish materials shall be installed in accordance with manufacturer's instructions.

Reason: ASTM C1325 cement board (technically, fiber-mat reinforced cementitious backer unit) was incorporated into the IRC in the mid-2000s when it was added to Section 702 as a substrate for interior wall tile in shower and tub areas.
In the interim period, C1325 cement board has gained use as an exterior substrate. It is primarily used for architectural stone and 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 IRC reference to the material is the interior use described in Section 702 confusion occurs regarding the ability to use cement board as an exterior substrate. This proposal intends to clarify that cement board conforming with the ASTM C1325 standard can be used as a substrate in exterior applications by expanding the existing IRC reference to apply to exterior applications under Section R703.

A change to the IBC with the same intent was approved during the 'A' Cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal has no cost impact. The intent of the proposal is to clarify that C1325 material can be used in an exterior application.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal clarifies that ASTM C1325 cement board can be used in an exterior application. The proposal correctly expands the existing IRC reference to apply to exterior applications under Section R703. The proposal was approved to be consistent with the approved IBC change in the group A cycle (Vote: 10-0).

Final Hearing Results

RB235-22	AS

RB236-22

Original Proposal

IRC: SECTION 202 (New), SECTION 202, R703.1.2, R703.3.1, R703.11.1, SECTION R704, R704.1, R704.2, R704.2.1, FIGURE R704.2.1(1), FIGURE R704.2.1(2), R704.2.2, R704.2.3, R704.2.4, R704.3, R704.3.1, R704.3.2, R704.3.3, R704.3.4, TABLE R704.3.4

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Add new definition as follows:

EXTERIOR SOFFIT.
A material or assembly of materials applied on the underside of exterior overhangs, decks and floors, porches, and carport ceilings.

Revise as follows:

[RB] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls~~for the purpose of providing a weather-resistive barrier, insulation or for aesthetics~~, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural *trim* and embellishments such as cornices~~, soffits, and fascias~~.

R703.1.2 Wind resistance. Wall coverings, backing materials and their attachments shall be capable of resisting wind loads in accordance with Tables R301.2.1(1) and R301.2.1(2). Wind-pressure resistance of the siding, exterior soffit and backing materials shall be determined by ASTM E330 or other applicable standard test methods. Where wind-pressure resistance is determined by design analysis, data from *approved* design standards and analysis conforming to generally accepted engineering practice shall be used to evaluate the siding, exterior soffit and backing material and its fastening. All applicable failure modes including bending rupture of siding, fastener withdrawal and fastener head pull-through shall be considered in the testing or design analysis. Where the wall covering, exterior soffit and backing material resist wind load as an assembly, use of the design capacity of the assembly shall be permitted.

R703.3.1 Exterior Soffit installation. Exterior Soffits shall comply with Section R704.

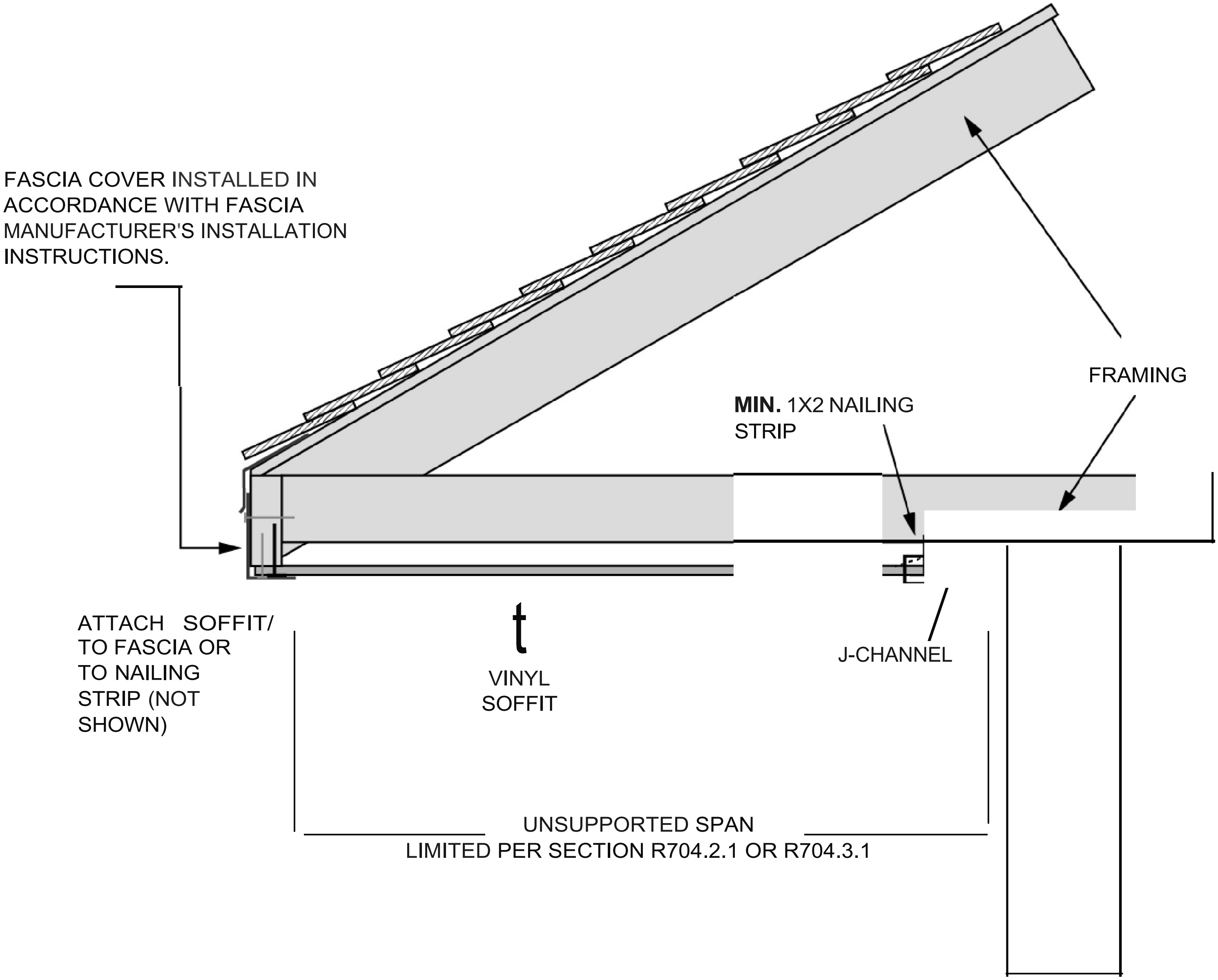
R703.11.1 Installation. Vinyl siding, exterior soffit and accessories shall be installed in accordance with the manufacturer’s instructions.

SECTION R704
EXTERIOR SOFFITS

R704.1 General wind limitations. Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffits shall comply with Section R704.2. Where the design wind pressure exceeds 30 pounds per square foot (1.44 kPa), exterior soffits shall comply with Section R704.3. The design wind pressure on exterior soffits shall be determined using the component and cladding loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.93 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2).

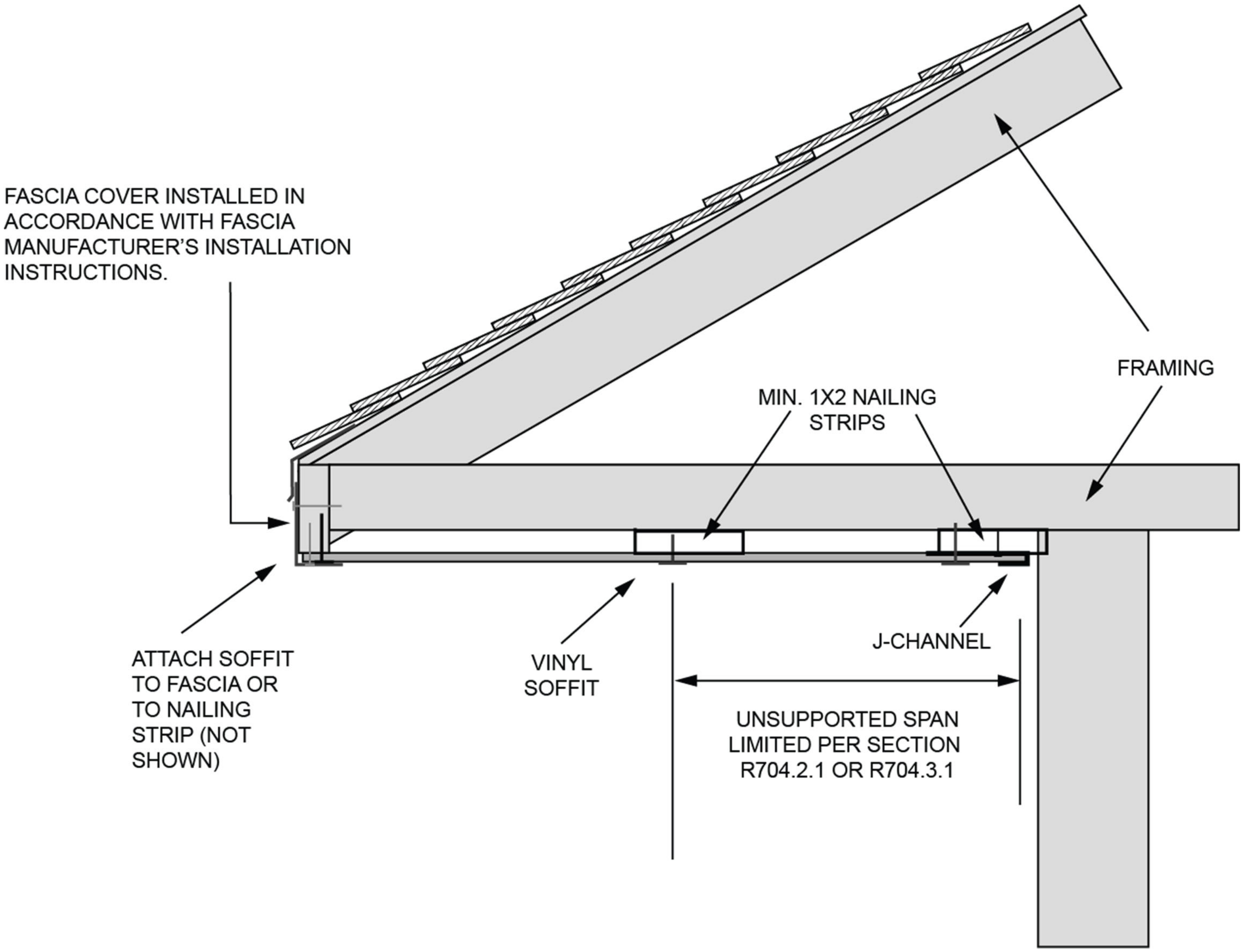
R704.2 Exterior Soffit installation where the design wind pressure is 30 psf or less. Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffit installation shall comply with Section R704.2.1, R704.2.2, R704.2.3 or R704.2.4. Exterior Soffit materials not addressed in Sections R704.2.1 through R704.2.4 shall be in accordance with the manufacturer’s installation instructions.

R704.2.1 Vinyl exterior soffit panels. Vinyl exterior soffit panels 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 R704.2.1(1). Where the unsupported span of exterior soffit panels is greater than 16 inches (406 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl exterior soffit panels shall be installed in accordance with the manufacturer’s installation instructions. Fascia covers shall be installed in accordance with the manufacturer’s installation instructions.



(Add 'exterior' in front of 'soffit' in three locations.)

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT



(Add 'exterior' in front of 'soffit' in three locations.)

FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

R704.2.2 Fiber-cement exterior soffit panels. Fiber-cement exterior soffit panels shall be a minimum of $^1/_4$ inch (6.4 mm) in thickness and shall 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. Exterior Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions.

R704.2.3 Hardboard exterior soffit panels. Hardboard exterior soffit panels shall be not less than $^7/_{16}$ inch (11.11 mm) in thickness and shall be fastened to framing or nailing strips 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.

R704.2.4 Wood structural exterior panel soffit. The minimum nominal thickness for wood exterior structural panel soffits shall be $^3/_8$ inch (9.5 mm) and shall be fastened to framing or nailing strips with 2-inch by 0.099-inch (51 mm by 2.5 mm) nails. Fasteners shall be spaced not less than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

R704.3 Exterior Soffit installation where the design wind pressure exceeds 30 psf. Where the design wind pressure is greater than 30 psf, exterior soffit installation shall comply with Section R704.3.1, R704.3.2, R704.3.3 or R704.3.4. Exterior Soffit materials not addressed in Sections R704.3.1 through R704.3.4 shall be in accordance with the manufacturer's installation instructions.

R704.3.1 Vinyl exterior soffit panels. Vinyl exterior soffit panels and their attachments shall be capable of resisting wind loads specified in

Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) . Vinyl exterior soffit panels 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 R704.2.1(1). Where the unsupported span of exterior soffit panels is greater than 12 inches (305 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl exterior soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

R704.3.2 Fiber-cement exterior soffit panels. Fiber-cement exterior soffit panels shall comply with Section R704.2.2 and shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2).

R704.3.3 Hardboard exterior soffit panels. Hardboard exterior soffit panels shall comply with the manufacturer's installation instructions and shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) .

R704.3.4 Wood structural panel exterior soffit. Wood structural panel exterior soffits shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2). Alternatively, wood structural panel exterior soffits shall be installed in accordance with Table R704.3.4.

TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL EXTERIOR SOFFIT [b, c, d, e]

MAXIMUM DESIGN PRESSURE (+ or - psf)	MINIMUM PANEL SPAN RATING	MINIMUM PANEL PERFORMANCE CATEGORY	NAIL TYPE AND SIZE	FASTENER[a] SPACING ALONG EDGES AND INTERMEDIATE SUPPORTS	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6[f]	4
40	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6	4
50	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	4
			8d common (2 1/2 × 0.131 × 0.281 head diameter)	6	6
60	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	3
			8d common (2 1/2 × 0.131 × 0.281 head diameter)	6	4
70	24/16	7/16	8d common (2 1/2× 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
80	24/16	7/16	8d common (2 1/2 × 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4

90	32/16	15/32	8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	4	3
			10d box (3 × 0.128 × 0.312 head diameter)	6	4

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Fasteners shall comply with Sections R703.3.2 and R703.3.3.

b. Maximum spacing of exterior 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 not fewer than two continuous spans.

e. Wood structural panels shall be attached toexterior soffit framing members with specific gravity of at least 0.42. Framing members shall be minimum 2 × 3 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 shall be not greater than 12 inches on center.

Reason: Over the past few cycles the treatment of exterior wall coverings and soffits has become separated and addressed in different sections of the code. R704 is now an entire section of the code dedicated to soffit and now fascia. The construction methods for these parts of the exterior of the structure are unique and prior to the last few cycles were not addressed at all. This has been a noticeable area in need of requirements based on wind performance failures due to lack of direction. With this change in definitions and resulting other areas of the code, it will help builders, installers and building officials better understand how R704 applies and how R703 applies. These definitions create clearer understanding of application.

Cost Impact: The code change proposal will increase the cost of construction
This code change will bring a necessary broadening of installation requirement for non-traditionally considered soffit applications. But without the change there is limited guidance on how this should be handled and regulated.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: EXTERIOR SOFFIT. A material or assembly of materials applied on the underside of exterior overhangs, ~~decks and floors, porches,~~ and attached carport ceilings.
[RB] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior wallsfor the purpose of providing a weather-resistive barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices.

R704.2.4 Wood structural panel exterior ~~panel~~ soffit. The minimum nominal thickness for wood ~~exterior~~ structural panel exterior soffits shall be / inch (9.5 mm) and shall be fastened to framing or nailing strips with 2-inch by 0.099-inch (51 mm by 2.5 mm) nails. Fasteners shall be spaced not less than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

Committee Reason: The committee determined that the modifications clarify exterior soffit and corrects the wood structural panel exterior soffit. The proposal as modified addresses requirements to avoid wind performance failures due to lack of directions. The proposal clarifies how Section R704 applies and how Section R703 applies (Vote: 6-3).

Public Comments

Public Comment 1

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

EXTERIOR SOFFIT. A material or assembly of materials applied on the underside of exterior overhangs, and attached carportand porch ceilings.

Commenter's Reason: The change as modified is a great step forward by splitting exterior wall covering and exterior soffit. This small modification is important as it includes ceiling soffits which should be included in this definition so it's clear they are included the provisions of the code.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This simply adds in the provision to make sure it's clear porches ceilings are included in the code provisions without affecting the cost of construction.

Final Hearing Results

RB236-22	AMPC1

RB237-22

Original Proposal

IRC: SECTION R703, SECTION R704, FIGURE R704.2.1(1), FIGURE R704.2.1(2), R704.3.1, R704.4 (New), R704.4.1 (New), R704.4.1.1 (New), R704.4.1.2 (New)

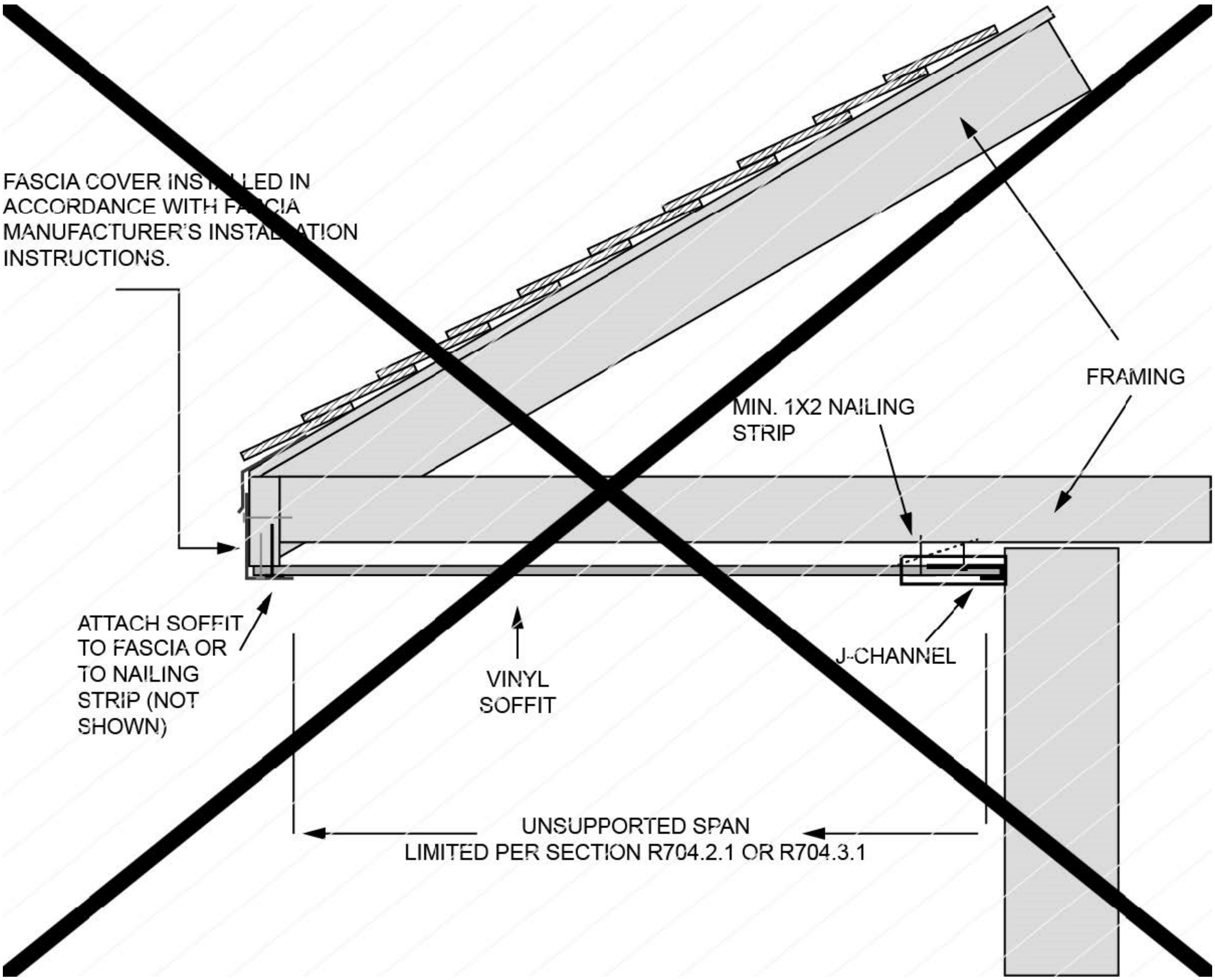
Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Residential Code

Revise as follows:

SECTION R703
EXTERIOR <u>WALL</u> COVERING

SECTION R704
<u>EXTERIOR</u> SOFFITS <u>AND FASCIAS</u>


FASCIA COVER INSTALLED IN ACCORDANCE WITH FASCIA MANUFACTURER'S INSTALLATION INSTRUCTIONS.
FRAMING
MIN. 1X2 NAILING STRIP
ATTACH SOFFIT TO FASCIA OR TO NAILING STRIP (NOT SHOWN)
VINYL SOFFIT
J-CHANNEL
UNSUPPORTED SPAN
LIMITED PER SECTION R704.2.1 OR R704.3.1

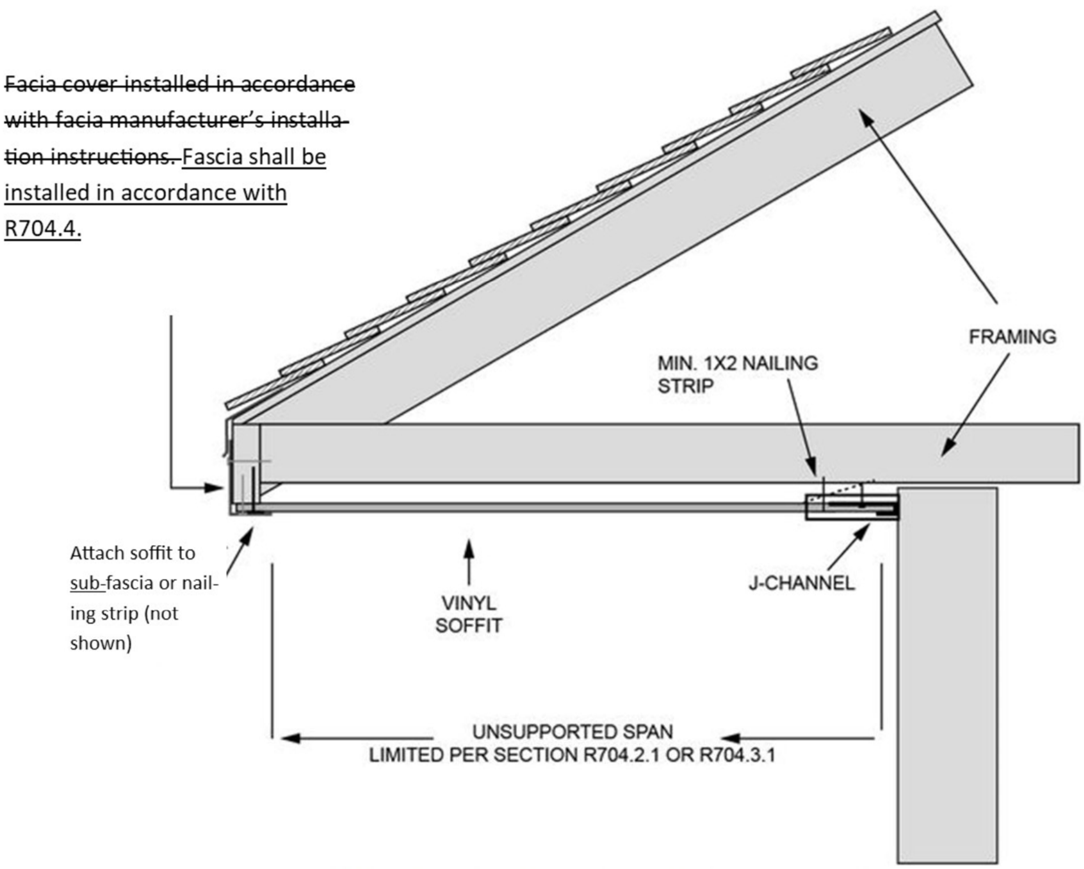
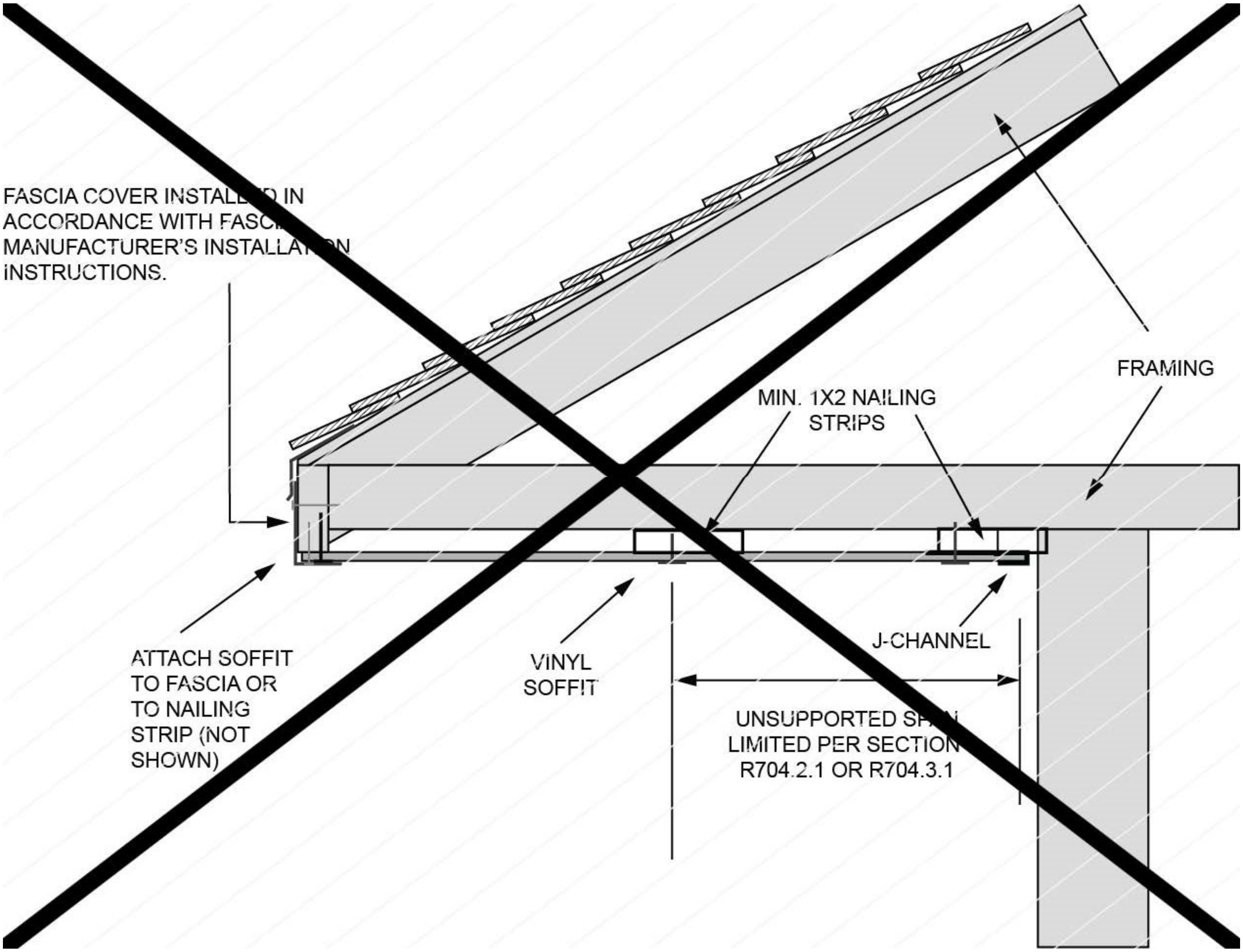


FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT


FASCIA COVER INSTAL D IN
ACCORDANCE WITH FASC
MANUFACTURER'S INSTALLAT N
INSTRUCTIONS.
FRAMING
MIN. 1X2 NAILING
STRIPS
ATTACH SOFFIT
TO FASCIA OR
TO NAILING
STRIP (NOT
SHOWN)
VINYL
SOFFIT
J-CHANNEL
UNSUPPORTED SP N
LIMITED PER SECTION
R704.2.1 OR R704.3.1

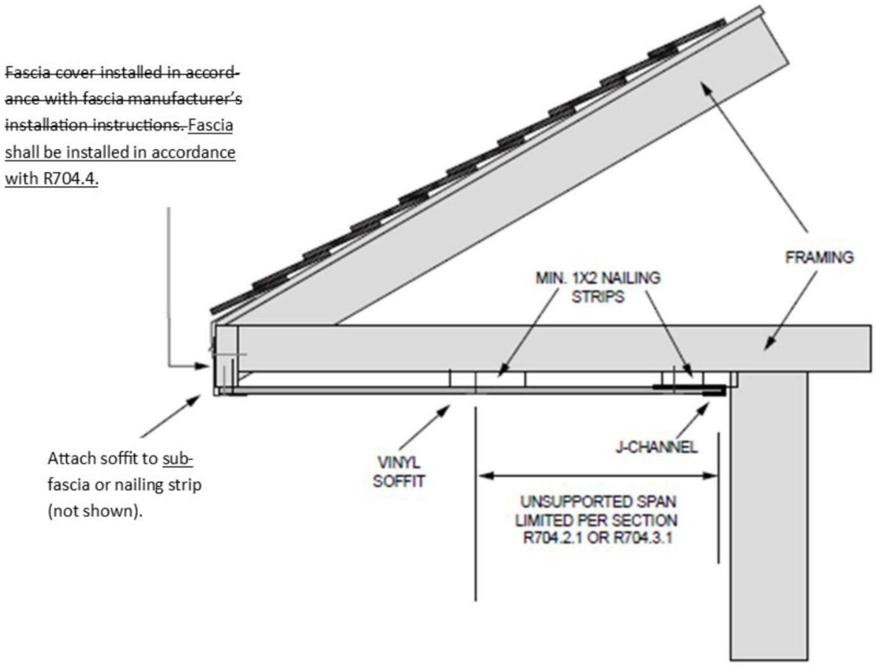


FIGURE R704.2.1(2)
TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

R704.3.1 Vinyl soffit panels. Vinyl soffit panels and their attachments shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) . Vinyl soffit panels 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 R704.2.1(1). Where the unsupported span of soffit panels is greater than 12 inches (305 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl soffit panels shall be installed in accordance with the manufacturer's installation instructions. ~~Fascia covers shall be installed in accordance with the manufacturer's installation instructions.~~

Add new text as follows:

R704.4 Fascia. Fascia shall be installed in accordance with*manufacturer's installation instructions.*

R704.4.1 Aluminum Fascia. Aluminum Fascia shall be installed in accordance with manufacturer's installation instructions and comply with Sections R704.4.1.1 or R704.4.1.2.

R704.4.1.1 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 (25 mm) below the drip edge and spaced a maximum of 24 inches (610 mm) on center.

R704.4.1.2 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 (406 m) on center and one finish nail located no more than 1 inch (25 mm) below the drip edge spaced a maximum of 16 inches (406 mm) 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 (152 mm) on center.

Reason: Currently the code does not provide specific instructions for the installation of fascia at the eaves and rakes. This is an area the code needs to address, as it has been identified as a point of weakness for failure during wind events. Based on results of recent testing, aluminum fascia can be installed with one fastener at the leg with a 1" or more coverage at the drip edge, although issues with fascia in non-high wind areas is not a noted issue.
In high wind conditions fascia will be required to have two fasteners, at the face and leg, or using utility trim and punch locks at drip edge.

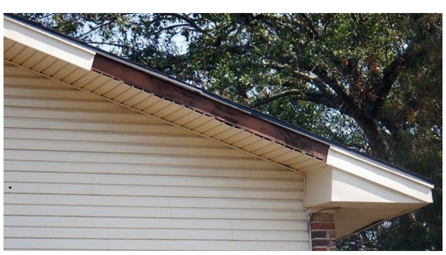
Attached are results from those tests and here is a link to the report as well.

https://www.vinylsiding.org/wp-content/uploads/2022/01/m9254.01-109-40-r0.pdf

Example from FEMA MAT reports include noted issues that this change will address.

- H-Harvey: See Section 4.1.4: "Being the leading edge of the roof system, soffits and fascia are particularly vulnerable to high winds."
- H-Irma: Multiple observations of fascia failure that appeared to initiate soffit and roof covering damage.

Here are examples of a failure from Hurricane Laura from 2020 where the fascia failed and also led to fascia and soffit failure.



Cost Impact: The code change proposal will increase the cost of construction
This change will increase the cost of construction in high wind areas. The increase would be the addition of finish nails and labor for installation which if fairly minimal consider how fascia is installed today or a more significant cost would be the addition of utility trim and punch locks. But again this would be for just high wind areas and this change really completes the exterior wall covering / roof connection point of the building where failures have been noted during hurricane and high wind conditions.'

The change will not increase the cost of construction in non-coastal areas as the proposed prescription is already being done in many cases.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee decided that the proposal provides clear instructions for the installation of fascia at the eaves and rakes, which is a point of weakness for failure during wind events. The committee also supports the language added to FIG. R704.2.1(1), and R704.2.1(2). One of the committee members suggested that the proponent looks into clarifying that the details added to the figures are not the only option allowed (Vote: 8-2).

Final Hearing Results

RB237-22	AS

RB238-22

Original Proposal

IRC: R703.3.1, R703.3.2, R703.3.3, R704.2.1, FIGURE R704.2.1(1), FIGURE R704.2.1(2)

Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org); Glenn Overcash, AECOM, Federal Emergency Management Agency (glenn.overcash@aecom.com)

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Delete without substitution:

~~**R703.3.1 Soffit installation.**~~ ~~Soffits shall comply with Section R704~~.

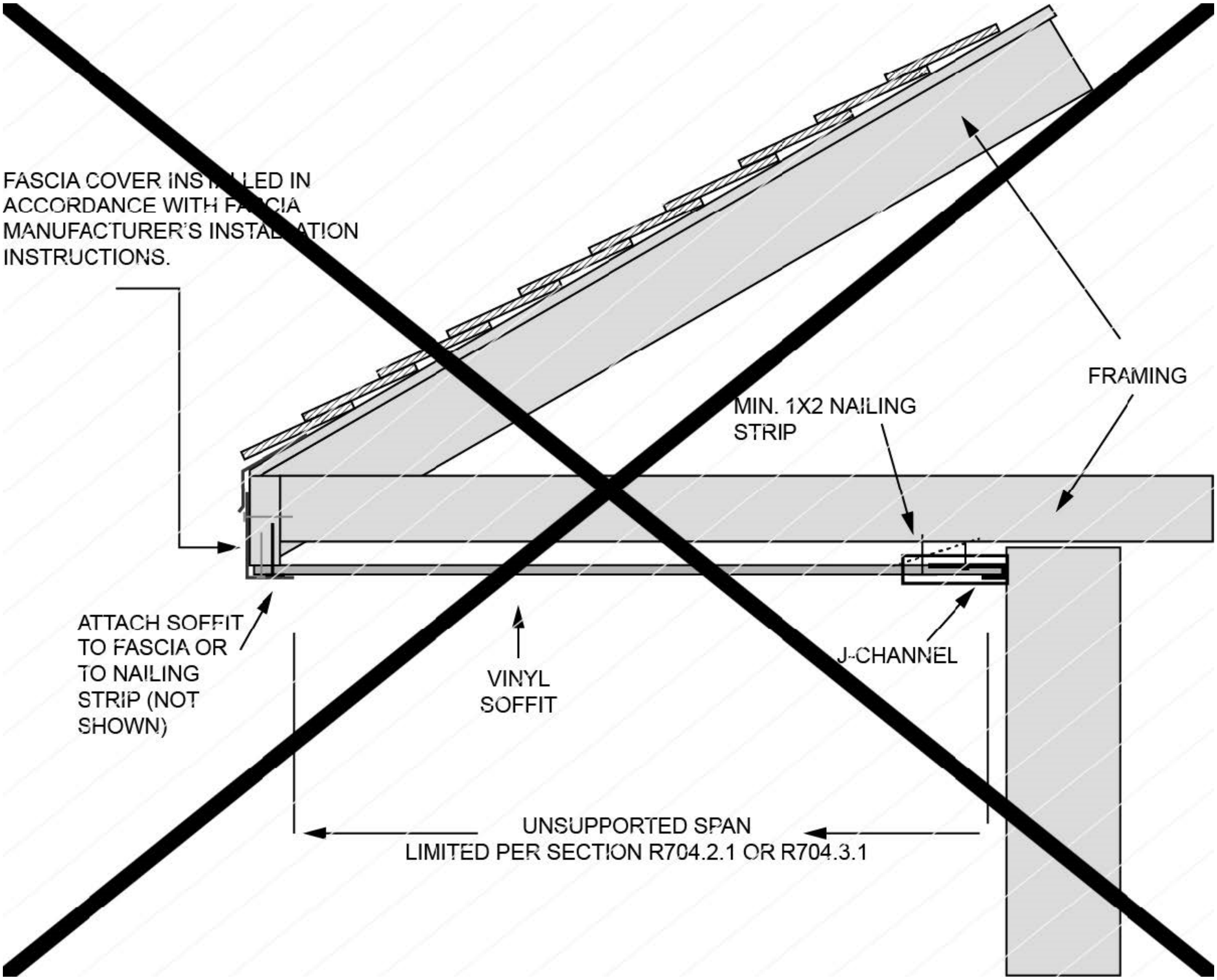
Revise as follows:

R703.3.2 Wind limitations. Where the design wind pressure exceeds 30 psf or where the limits of Table R703.3.2 are exceeded, the attachment of wall coverings ~~and soffits~~ shall be designed to resist the component and cladding loads specified in Table R301.2.1(1) for walls, adjusted for height and exposure in accordance with Table R301.2.1(2). For the determination of wall covering ~~and soffit attachment~~, component and cladding loads shall be determined using an effective wind area of 10 square feet (0.93 m^2).

R703.3.3 Fasteners. Exterior wall coverings ~~and roof overhang soffits~~ shall be securely fastened with aluminum, galvanized, stainless steel or rust-preventative coated nails or staples in accordance with Table R703.3(1) or with other *approved* corrosion-resistant fasteners in accordance with the wall covering manufacturer's installation instructions. Nails and staples shall comply with ASTM F1667. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples shall have a minimum crown width of $^7/_{16}$ inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire. Where fiberboard, gypsum, or foam plastic sheathing backing is used, nails or staples shall be driven into the studs. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with either the siding manufacturer's installation instructions or Table R703.3.3.

R704.2.1 Vinyl <u>and aluminum</u> soffit panels. Vinyl <u>and aluminum</u> soffit panels shall be installed using<u>aluminum, galvanized, stainless steel or rust-preventative coated nails or staples or other *approved* corrosion-resistant</u> 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 R704.2.1(1). Where the unsupported span of soffit panels is greater than 16 inches (406 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl <u>and aluminum</u> soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

Delete and substitute as follows:



~~FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT~~

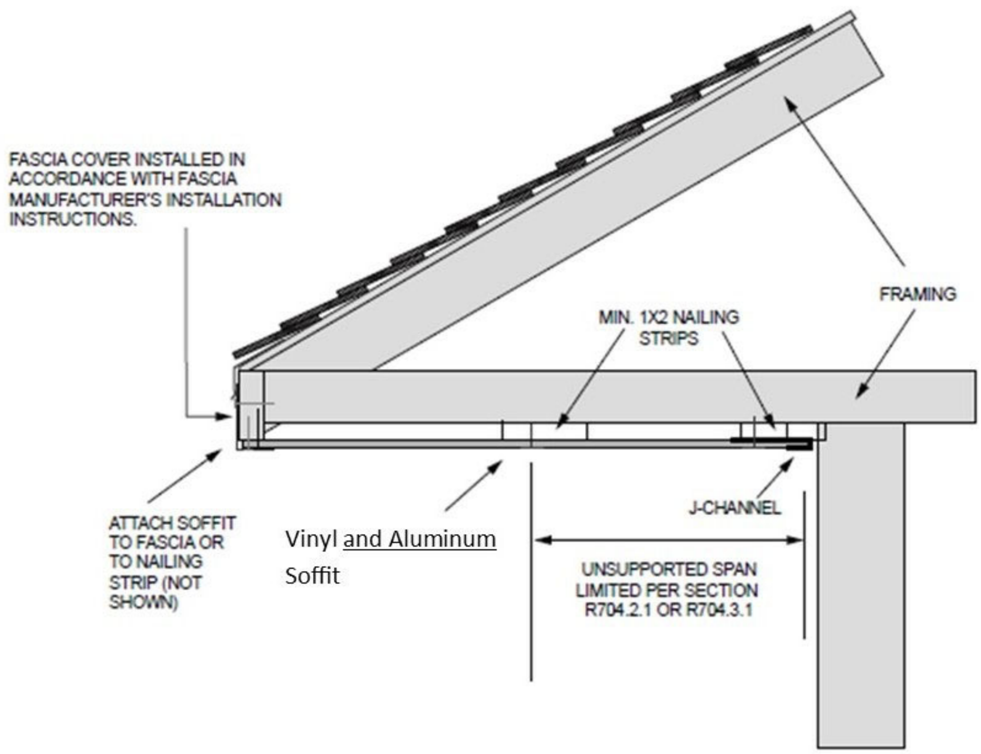
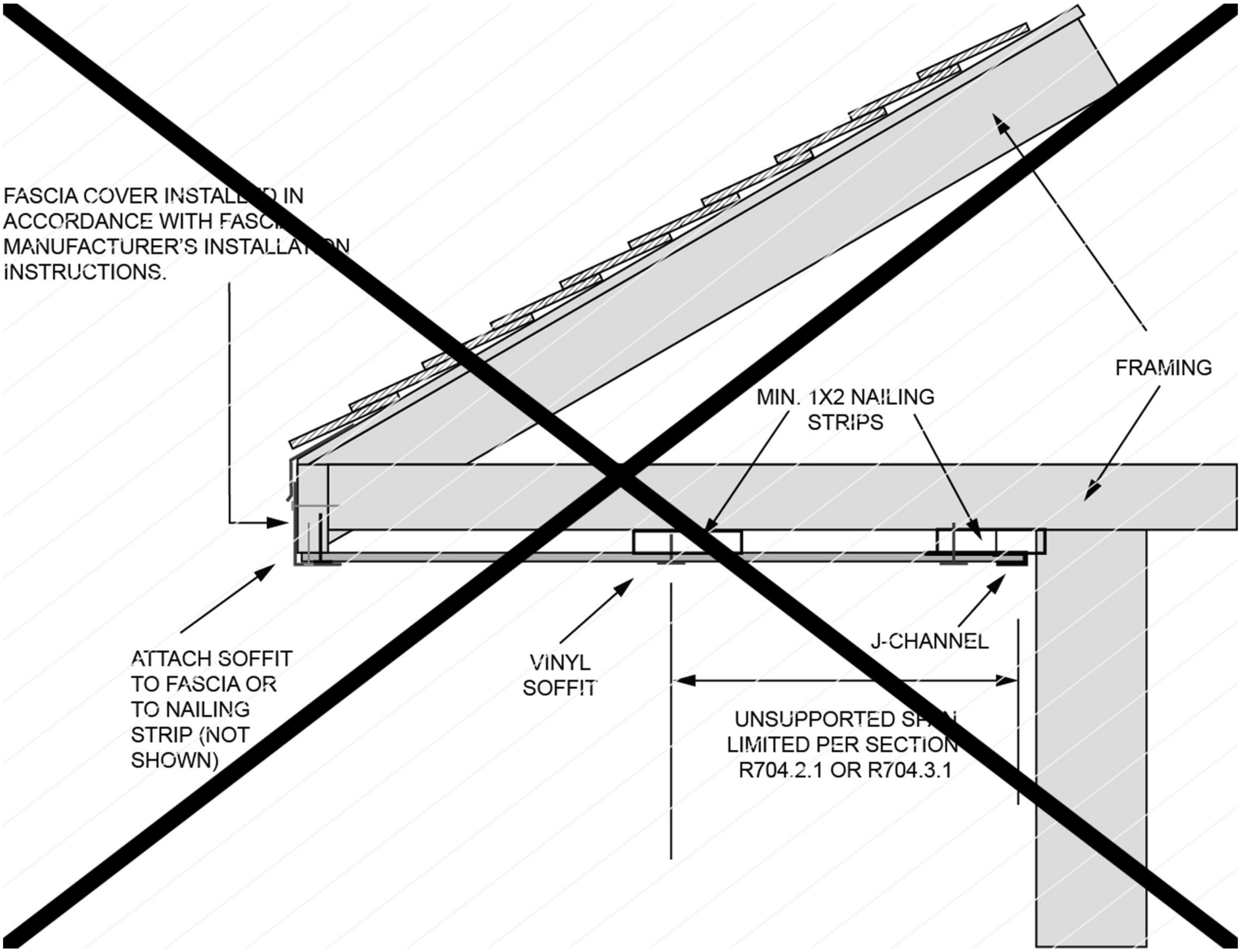


FIGURE R704.2.1(2)

Typical Single Span Vinyl and Aluminum Soffit Panel Support

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT



~~**FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT**~~

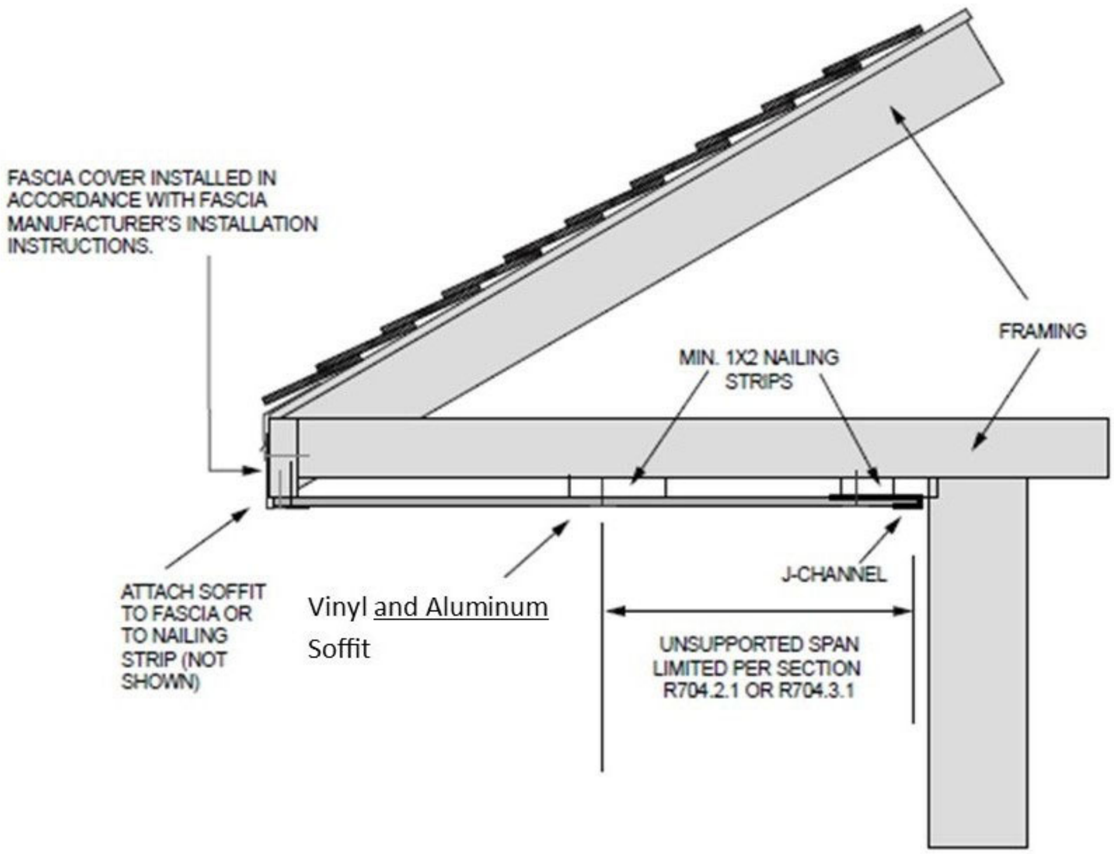


FIGURE R704.2.1(2)

Typical Single Span Vinyl and Aluminum Soffit Panel Support

FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

Reason: Currently the code does not provide specific requirements for the installation of aluminum soffit. This code change proposal adds aluminum soffit requirements to the existing vinyl soffit subsection because provisions for both materials are essentially the same. In addition, this change includes some correlation edits to remove soffit references from Section R703 where soffits were addressed prior to development of Section R704.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simple change brings common practice into the code without any technical changes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal brings common practice for the installation of the aluminum soffit to the code users. In addition, the proposal correctly removes soffits references from Section R703, since Section R704 is the appropriate section (Vote: 10-0).

Final Hearing Results

RB238-22	AS

RB239-22

Original Proposal

IRC: TABLE R704.3.4

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council, American Wood Council (pline@awc.org)

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Revise as follows:

TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE 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	FASTENER[a] SPACING[e] ALONG EDGES AND INTERMEDIATE SUPPORTS, inches	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6[f]	4
40	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	6	4
50	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	4
			8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	6	6
60	24/0	3/8	6d box (2 × 0.099 × 0.266 head diameter)	4	3
			8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	6	4
70	24/16	7/16	8d common ($2^1/_2$× 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
80	24/16	7/16	8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	4	4
			10d box (3 × 0.128 × 0.312 head diameter)	6	4
90	32/16	15/32	8d common ($2^1/_2$ × 0.131 × 0.281 head diameter)	4	3
			10d box (3 × 0.128 × 0.312 head diameter)	6	4

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Fasteners shall comply with Sections R703.3.2 and R703.3.3.

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 not fewer than two continuous spans.

e. ~~Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.42~~Where the specific gravity of the wood species used for soffit framing members is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, the fastener spacing shall be multiplied by 0.67 or the same fastener spacing as prescribed for galvanized steel nails shall be permitted to be used where RSRS-01 (2″× 0.099″× 0.266″ head) nails replace 6d box nails and RSRS-03 (2-1/2″× 0.131″× 0.281″ head) nails replace 8d common nails or 10d box nails or alternative fastening shall be designed in accordance with AWC NDS. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 × 3 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 shall be not greater than 12 inches on center.

Reason: The change addresses the use of soffit framing of wood species having lower specific gravity than the value of 0.42 associated with prescribed spacing of nails. The expanded footnote e provides equivalent performing prescriptive fastening options for cases where specific gravity is as low as 0.35 in accordance with AWC NDS. Withdrawal design values are provided in the AWC NDS for the RSRS nail (a standard ring shank nail) and the RSRS nail sizes prescribed in the footnote align with proposed RSRS nail options for roof sheathing fastening. An option for design of alternative fastening is also provided.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides prescriptive fastening options for soffit attachment to wood species with lower specific gravity than that existing 0.42 baseline for the tabulated requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL SOFFIT [b, c, d, e]
Portions of table and footnotes not shown remain unchanged.

e. Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.35Where the specific gravity of the wood species used for soffit framing members is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, the fastener spacing shall be multiplied by 0.67 or the same fastener spacing as prescribed for galvanized steel nails shall be permitted to be used where RSRS-01 (2″× 0.099″× 0.266″ head) nails replace 6d box nails and RSRS-03 (2-1/2″× 0.131″× 0.281″ head) nails replace 8d common nails or 10d box nails~~ or alternative fastening shall be designed in accordance with AWC NDS~~. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 × 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

Committee Reason: The committee concluded that the modification provides necessary clarity and helps enforce the added prevision. The committee decided that the proposal, as modified, provides requirements for soffit framing of wood species having lower specific gravity than the value of 0.42 associated with the prescribed spacing of nails (Vote: 10-0).

Public Comments

Public Comment 1

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org); Philip Line, American Wood Council (pline@awc.org) requests As Modified by Public Comment

Further modify as follows:

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TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL SOFFIT [b, c, d, e]

Portions of table not shown remain unchanged.

MAXIMUM DESIGN PRESSURE (+ or - psf)	MINIMUM PANEL SPAN RATING	MINIMUM PANEL PERFORMANCE CATEGORY	NAIL TYPE AND SIZE	FASTENER[a] SPACING[e] ALONG EDGES AND INTERMEDIATE SUPPORTS, inches	
				Galvanized Steel	Stainless Steel

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

e. Fastener spacing applies where wood ~~Wood structural panels shall be attached to~~soffit framing ~~members with~~ specific gravity ~~of at least 0.35~~ is 0.42 or larger. Where the specific gravity of t~~he wood species used for~~ soffit framing members is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, the fastener spacing shall be multiplied by 0.67 or the same fastener spacing as prescribed for galvanized steel nails shall be permitted to be used where RSRS-01 (2″× 0.099″× 0.266″ head) nails replace 6d box nails and RSRS-03 (2-1/2″× 0.131″× 0.281″ head) nails replace 8d common nails or 10d box nails. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 × 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

Commenter's Reason: The change proposal as well as the public comment addresses the use of soffit framing having lower specific gravity than 0.42 associated with prescribed spacing of nails. The proposed public comment modifications to the Approved as Modified language from the committee action hearings aims to revise the first sentence of the footnote so that it describes the specific gravity basis o the prescribed nailing (i.e., specific gravity equal to 0.42). The remainder of the footnote describes prescriptive alternative fastening options for low specific gravity soffit framing in more simple terms without technical change.

For reference, the four major lumber species/species combinations for which prescriptive span tables are provided in the IRC and their assigned specific gravity per NDS are tabulated below (all have specific gravity of at least 0.42). A full listing of specific gravity for lumber species/species combinations is available in the National Design Specification (NDS) for Wood Construction and its Supplement.

Lumber species/species combination and specific gravity (G)

Southern pine (G=0.55)

Douglas fir-larch (G=0.50)

Hem-fir (G=0.43)

Spruce-pine-fir (G=0.42)

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction There is no cost increase associated with the reorganization of the soffit fastening footnote in this public comment or with providing a prescriptive fastening option for low specific gravity framing in the As Modified version of this change proposal.

Final Hearing Results

RB239-22 AMPC1

RB240-22

Original Proposal

IRC: SECTION R705 (New), R705.1 (New)

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)

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Add new text as follows:

SECTION R705
BIPV SYSTEMS FOR EXTERIOR WALL COVERINGS AND FENESTRATION

R705.1 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 9. New applications for BIPV systems are systems that are used as either exterior wall coverings or fenestration. The IRC is silent on the requirements for such systems.Chapter 7 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 IRC.
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: Reference:
FS150-21

IBC Section 1410 and 1410.1

Cost Impact: The 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 committee approved this proposal based on the fact that the proposal adds needed requirements for Building Integrated Photovoltaic (BIPV) systems used as exterior wall coverings or fenestration (Vote: 10-0)

Final Hearing Results

RB240-22	AS

RB241-22

Original Proposal

IRC: R802.1.5, R802.1.5.1, R802.1.5.2, R802.1.5.3, R802.1.5.3.1, R802.1.5.4, R802.1.5.5, R802.1.5.6, R802.1.5.7, R802.1.5.8, R802.1.5.9 R802.1.5.10

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

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Revise as follows:

~~R802.1.5~~ R302.15 Fire-retardant-treated wood. Fire-retardant-treated wood (FRTW) 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. In addition, the ASTM E84or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

~~R802.1.5.1~~ R302.15.1 Pressure process. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (344.7 kPa).

~~R802.1.5.2~~ R302.15.2 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an *approved* method of protection as required by this section.

~~R802.1.5.3~~ R302.15.3 Testing. For fire-retardant-treated wood products, the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R302.15 ~~R802.1.5~~.

~~R802.1.5.3.1~~ R302.15.3.1 Fire testing of wood structural panels. *Wood structural panels* shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm).

~~R802.1.5.4~~ R302.15.4 Labeling. In addition to the *labels* required by Section 802.1.1 for sawn lumber and Section 803.2.1 for *wood structural panels*, each piece of *fire-retardant-treated* lumber and *wood structural panel* shall be *labeled*. The *label* shall contain:

1. The identification *mark* of an *approved agency* in accordance with Section 1703.5 of the International Building Code.
2. Identification of the treating manufacturer.
3. The name of the fire-retardant treatment.
4. The species of wood treated.
5. Flame spread index and *smoke-developed index*.
6. Method of drying after treatment.
7. Conformance to applicable standards in accordance with Sections R302.15.5 through R302.15.10 ~~R802.1.5.5 through R802.1.5.10~~.
8. For FRTW exposed to weather, or a damp or wet location, the words “No increase in the listed classification when subjected to the Standard Rain Test” (ASTM D2898).

~~R802.1.5.5~~ R302.15.5 Strength adjustments. Design values for untreated lumber and *wood structural panels* as specified in Section R802.1 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.

~~**R802.1.5.6**~~ **R302.15.6 Wood structural panels.** The effect of treatment and the method of redrying after treatment, and 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 ASTM D5516 shall be used to develop 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 their treatment.

~~**R802.1.5.7**~~ **R302.15.7 Lumber.** For each species of wood treated, the effect of the treatment and the method of redrying after treatment and 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 ASTM D5664 shall be used to develop modification 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 factors for service at 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.

~~**R802.1.5.8**~~ **R302.15.8 Exposure to weather.** Where fire-retardant-treated wood is exposed to weather or damp or wet locations, it shall be identified as “Exterior” to indicate there is not an increase in the *listed* flame spread index as defined in SectionR302.15 ~~R802.1.5~~ when subjected to ASTM D2898.

~~**R802.1.5.9**~~ **R302.15.9 Interior applications.** Interior fire-retardant-treated wood shall have a moisture content of not over 28 percent when tested in accordance with ASTM D3201 procedures at 92-percent relative humidity. Interior fire-retardant-treated wood shall be tested in accordance with Section R302.15.6 or R302.15.7 ~~R802.1.5.6 or R802.1.5.7~~. Interior fire-retardant-treated wood designated as Type A shall be tested in accordance with the provisions of this section.

~~**R802.1.5.10**~~ **R302.15.10 Moisture content.** Fire-retardant-treated wood shall be dried to a moisture content of 19 percent or less for lumber and 15 percent or less for *wood structural panels* before use. For wood kiln dried after treatment (KDAT) the kiln temperatures shall not exceed those used in kiln drying the lumber and plywood submitted for the tests described in Section ~~R802.1.5.6~~ R302.15.6 for plywood and R302.15.7 ~~R802.1.5.7~~ for lumber.

Reason: This proposal literally does not make any changes in code language, other than moving the entire section R802.1.5, on fire-retardant-treated wood, into chapter 3 as a new section R302.15 (and ensure the correct sections are referenced). The reason is chapter 3 is the chapter containing all the fire test requirements for materials. On the other hand, chapter 8 addresses roof-ceiling construction and fire-retardant-treated wood has applicability way beyond roofs and ceilings and it should be placed where all products that have fire safety requirements are placed.
The present section R302.9 addresses flame spread index and smoke developed index for wall and ceiling finishes. The section in front of it, R302.8, addresses a particular type of product (foam plastics), and, therefore, creating a new section R302.9 might have been a reasonable location for fire-retardant treated wood, which is a particular product, requiring fire testing, but is not restricted to wall and ceiling finishes (or to roofs and ceilings). The proposal instead just places the "moved" section to a new section at the end, so as not to renumber existing sections.

This proposal does not intend to replace any existing section or any existing requirements but just to add a new section, taken from chapter 8, unchanged.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply relocates the section on fire-retardant-treated wood, without changing any of the language.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal relocates section R802.1.5, on fire-retardant-treated wood, into Chapter 3 as a new Section R302.15 without technical changes. This relocation ensures that the correct sections are referenced. The committee suggested that the title for Section 302 should be revised to be more appropriate, such as “Fire

Safety" (Vote: 7-3).

Final Hearing Results

RB241-22	AS

RB243-22

Original Proposal

IRC: R802.1.5.3, R802.1.5.3.1, R802.1.5.4, R802.1.5.6, R802.1.5.7, R802.1.5.10

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

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R802.1.5.3 Testing. For fire-retardant-treated wood products, the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R802.1.5.

Revise as follows:

R802.1.5.3.1 Fire testing of fire-retardant-treated wood structural panels. *~~Wood~~* *Fire-retardant-treated wood* *structural panels* shall be tested with a ripped or cut longitudinal gap of $^{1}/_{8}$ inch (3.2 mm).

R802.1.5.4 Labeling. In addition to the *labels* required by Section 802.1.1 for sawn lumber and Section 803.2.1 for *wood structural panels*, each piece of *fire-retardant-treated* lumber and fire-retardant-treated *wood structural panel* shall be *labeled*. The *label* shall contain:

1. The identification *mark* of an *approved agency* in accordance with Section 1703.5 of the International Building Code.
2. Identification of the treating manufacturer.
3. The name of the fire-retardant treatment.
4. The species of wood treated.
5. Flame spread index and *smoke-developed index*.
6. Method of drying after treatment.
7. Conformance to applicable standards in accordance with Sections R802.1.5.5 through R802.1.5.10.
8. For FRTW exposed to weather, or a damp or wet location, the words “No increase in the listed classification when subjected to the Standard Rain Test” (ASTM D2898).

R802.1.5.5 Strength adjustments. Design values for untreated lumber and *wood structural panels* as specified in Section R802.1 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.

R802.1.5.6 ~~Wood~~ Fire-retardant-treated wood structural panels. The effect of treatment and the method of redrying after treatment, and 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 ASTM D5516 shall be used to develop 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 their treatment.

R802.1.5.7 ~~Lumber~~ Fire-retardant-treated lumber. For each species of wood treated, the effect of the treatment and the method of redrying after treatment and 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 ASTM D5664 shall be used to develop modification 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 factors for service at 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.

R802.1.5.10 Moisture content. Fire-retardant-treated wood shall be dried to a moisture content of 19 percent or less for <u>fire-retardant treated</u> lumber and 15 percent or less for <u>fire-retardant-treated</u> *wood structural panels* before use. For wood kiln dried after treatment (KDAT) the kiln temperatures shall not exceed those used in kiln drying the <u>fire-retardant-treated wood structural panels and fire-retardant-treated</u> lumber ~~and plywood~~ submitted for the tests described in Section R802.1.5.6 for <u>fire-retardant-treated wood structural panels</u> ~~plywood~~ and R802.1.5.7 for <u>fire-retardant-treated</u> lumber.

Reason: This section deals with fire-retardant-treated wood of two kinds and it is important to distinguish between them: fire-retardant-treated lumber and fire-retardant-treated wood structural panels. Also, section R802.1.5.3.1 talks about requirements for "fire testing of wood structural panels" but this should refer purely to fire-retardant-treated wood structural panels and not to other wood structural panels.

Note that section R802.1.5.4 (Labeling) addresses labeling of all types of wood structural panels (as required by R803.2.1) and then clarifies that the additional labels in this section apply to <u>both</u> fire-retardant-treated lumber and fire-retardant-treated wood structural panels.

The proposal addresses distinguishing these products without changing requirements, making it basically editorial clarification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is basically editorial clarification.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal due to the fact that the proposal distinguishes between fire-retardant-treated lumber and fire-retardant-treated wood structural panels. In addition, the proposal addresses the title issue for section R802.1.5.3.1. Section R802.1.5.3.1 requires "fire testing of wood structural panels" while it should be for fire-retardant-treated wood structural panels (Vote: 10-0).

Final Hearing Results

RB243-22 AS

RB244-22

Original Proposal

IRC: TABLE R802.5.2(1)

Proponents: Randy Shackelford, Simpson Strong-Tie Co., Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2021 International Residential Code

Revise as follows:

TABLE R802.5.2(1) RAFTER/CEILING JOIST HEEL JOINT CONNECTIONS[g]

RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20[e]			30			50			70		
		Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint splices connection [a, b, c, d, f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	12	6	12	17	8	15	23
	19.2	4	8	12	5	10	14	7	14	21	9	18	27
	24	5	10	15	6	12	18	9	17	26	12	23	34
4:12	12	3	4	6	3	5	7	4	7	10	5	9	13
	16	3	5	8	3	6	9	5	9	13	6	12	17
	19.2	3	6	9	4	7	11	6	11	16	7	14	21
	24	4	8	11	5	9	13	7	13	19	9	17	26
5:12	12	3	3	5	3	4	6	3	6	8	4	7	11
	16	3	4	6	3	5	7	4	7	11	5	9	14
	19.2	3	5	7	3	6	9	5	9	13	6	11	17
	24	3	6	9	4	7	11	6	11	16	7	14	21
7:12	12	3	3	4	3	3	4	3	4	6	3	5	8
	16	3	3	5	3	4	5	3	5	8	4	7	10
	19.2	3	4	5	3	4	6	3	6	9	4	8	12
	24	3	5	7	3	5	8	4	8	11	5	10	15
9:12	12	3	3	3	3	3	3	3	3	5	3	4	6
	16	3	3	4	3	3	4	3	4	6	3	5	8
	19.2	3	3	4	3	4	5	3	5	7	3	6	9
	24	3	4	5	3	4	6	3	6	9	4	8	12
12:12	12	3	3	3	3	3	3	3	3	4	3	3	5
	16	3	3	3	3	3	3	3	3	5	3	4	6
	19.2	3	3	3	3	3	4	3	4	6	3	5	7
	24	3	3	4	3	3	5	3	5	7	3	6	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. 10d common (3″ × 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. 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 shall be 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. Applies to roof live load of 20 psf or less.

f. 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 802.5.2(2).

g. Tabulated requirements are based on 10 psf roof dead load in combination with the specified roof snow load and roof live load.

Reason: This is a simple editorial change. Currently the table column heading calls out the number of nails in "heel joint splices". This connection is not a splice. This is a connection between the ends of the ceiling joists and the rafters. So it is proposed to simply change "splices" to "connections" to match the wording used in the Table title.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost impact. Just an editorial change.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal considering the fact that the proposal corrects the splices to connection in Table R802.5.2(1). Currently, the table header states, " Required number of 16d common nails per heel joint splices" while it should be a connection (Vote: 10-0).

Final Hearing Results

RB244-22	AS

RB247-22

Original Proposal

IRC: R802.11

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 Residential Code

Revise as follows:

R802.11 Roof tie uplift resistance. *Roof assemblies* shall have uplift resistance in accordance with Sections R802.11.1 and R802.11.2.

Exceptions: Rafters or trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1) where either of the following occur:

1. Where the specific gravity of the wood species used for wall framing is greater than or equal to 0.42 in accordance with AWC NDS and the uplift force per rafter or truss does not exceed 200 pounds (90.8 kg) as determined by Table R802.11.
2. Where the basic wind speed does not exceed 115 miles per hour (51.4 m/s), the wind exposure category is B, the roof pitch is 5 units vertical in 12 units horizontal (42-percent slope) or greater, the roof span is 32 feet (9754 mm) or less, and rafters and trusses are spaced not more than 24 inches (610 mm) on center.

Reason: The change addresses the potential use of wall framing of wood species having lower specific gravity than the value of 0.42 which is associated with the 200 pound capacity for prescriptive nailing of rafter/ceiling joist to top plates. With this change, Exception 1 is limited to most commonly used wood species with a minimum specific gravity of 0.42. For wall framing of species with low specific gravity (i.e., 0.35) the withdrawal capacity is approximately only 2/3 of that associated with specific gravity of 0.42. While a 133 pound capacity for prescriptive nailing could be associated with wood species having specific gravity of 0.35, the approach to limit application of the exception to specific gravity of 0.42 or greater associated with commonly used wood species is proposed for simplicity of requirements.

Cost Impact: The code change proposal will increase the cost of construction
Increased cost are associated with use of lower specific gravity wood species where the exception will not apply because this change identifies the existing specific gravity basis for the 200 lb capacity. For lower specific gravity framing, provisions for uplift connections to meet forces contained in existing Table R802.11 are applicable.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal due to the fact that the proposal adds text to Section R802.11, Exception #1. The added text limits Exception #1 to wood species with a minimum specific gravity of 0.42 (Vote: 10-0).

Final Hearing Results

RB247-22	AS

RB249-22

Original Proposal

IRC: R807.1

Proponents: Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

R807.1 Attic access. Buildings with ~~combustible ceiling or roof construction~~ attics shall have an ~~attic~~ access opening to attic areas that have a vertical height of 30 inches (762 mm) or greater over an area of not less than 30 square feet (2.8 m^2). The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.
The rough-framed opening shall be not less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other location with *ready access*. Where located in a wall, the opening shall be not less than 22 inches wide by 30 inches high (559 mm wide by 762 mm high). Where the access is located in a ceiling, minimum unobstructed headroom in the attic space shall be 30 inches (762 mm) at some point above the access measured vertically from the bottom of ceiling framing members. See Section M1305.1.2 for access requirements where mechanical *equipment* is located in *attics*.

Reason: This proposal would expand the requirements for attic access to not only combustible construction but any type of construction. Currently if a house was built out of metal framing the code would not require the attic access. The intent of the existing code language as explained in the Code Commentary is "The requirement for attic access is predicated on the likelihood that during the life of the structure, access to an attic space for repair of piping, electrical, and mechanical systems will be required." Also these attic accesses allow homeowners and contractors ability to install new equipment such as ductwork for swamp coolers, radon fans, whole house fans, solar piping, etc. Since the Code now allows the use of non combustible materials to frame a house this section needs to change to accomodate that.

Cost Impact: The code change proposal will increase the cost of construction
This proposed new language would increase construction cost since it would now apply to structures not built out of combustible construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee approved the proposal considering the fact that the deletion of combustible ceiling or roof construction in Section R807.1, Attic access, expands the requirements for attic access to not only combustible construction but any type of construction (Vote: 10-0).

Final Hearing Results

RB249-22	AS

RB250-22

Original Proposal

IRC: R807.1

Proponents: Timothy Pate, City and County of Broomfield, Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Residential Code

Revise as follows:

R807.1 Attic access. Buildings with combustible ceiling or roof construction shall have an attic access opening to attic areas that have a vertical height of 30 inches (762 mm) or greater over an area of not less than 30 square feet (2.8 m^2). The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.
The rough-framed opening shall be not less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other location with *ready access*. Where located in a wall, the opening shall be not less than 22 inches wide by 30 inches high (559 mm wide by 762 mm high). Where the access is located in a ceiling, minimum unobstructed headroom in the attic space shall be 30 inches (762 mm) <u>along at least one side</u>~~at some point~~ above the access measured vertically from the bottom of the ceiling framing members. See Section M1305.1.2 for access requirements where mechanical *equipment* is located in *attics*.

Reason: This proposal is to modify the language to show how to measure the required unobstructed headroom for attic access. Currently the Code says "at some point" which could be interpreted as a very short area - maybe an inch or two. My proposed language is to explain that you would need at least one entire side of the attic access opening to meet the 30" minimum height requirement so that someone would be able to get into the attic.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is to just clarify how to get the required 30" minimum headroom height.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approval was based on simplifying the measurement of the minimum unobstructed headroom in the attic space to be 30 inches along at least one side above the access measured vertically from the bottom of the ceiling framing members (Vote: 9-1).

Final Hearing Results

RB250-22 AS

RB251-22

Original Proposal

IRC: R902.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R902.1 Roof covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C *roof assemblies* ~~roofing~~ shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Where Class A, B, or C *roof assemblies* are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the *roof assembly* shall be *listed* and identified as to Class by an *approved* testing agency. ~~Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790~~.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

Reason: Changing "roofing" to "roof assemblies" in Section R902.1 is important to recognize that roof assemblies are classified, not "roofing." The additional changes create a logical progression of thought that establishes when fire classification is required, what tests are to be done when fire classification is necessary, and provisions for listing when that additional step is appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects language and restates and reorders existing provisions to reduce opportunities for confusion. Since there are no technical changes introduced, no change in cost of construction is anticipated if the proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal corrects that the roof assembly should be listed and identified as to Class by an approved testing agency. The committee also agreed with replacing of "roofing" with "roof assemblies" in the roof covering materials section's charging statement to emphasize that roof assemblies need to be classified (Vote: 6-4).

Final Hearing Results

RB251-22 AS

RB252-22

Original Proposal

IRC: R902.1
Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2021 International Residential Code

Revise as follows:

R902.1 Roof ~~covering materials~~ assemblies. Roofs shall be covered with materials as set forth in Section ~~Sections~~ R904 ~~and~~ or with roof coverings as set forth in Section R905. Class A, B or C ~~roofing~~ roof assemblies shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Where Class A, B or C roof assemblies are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the roof assembly shall be listed ~~Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790~~.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

Reason: This proposal clarifies the section and makes the terminology consistent with chapter 2 definitions, with the subsections (all of which describe roof assemblies) and with sections 904 and 905.

Chapter 2 defines "roof assembly" as "A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6."
Chapter 2 does not define "roofing" or "roof covering material" but it defines "roof covering" as "The covering applied to the roof deck for weather resistance, fire classification or appearance."

The section contains the words "roof covering materials" and "roofing" as well as "roof assembly" (or actually its plural, roof assemblies).

The fire test in ASTM E108 or UL 790 must be conducted on the "roof assembly", meaning that it must be conducted on the entir***reoof covering system*** and not on the individual roofing material or roof covering (the chapter on definitions clarifies that "roof covering system" is the same as "roof assembly").

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply corrects the terminology for consistency.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies the section and makes the terminology consistent with Chapter 2 definitions for roof assemblies. The proposal does include roof coverings in the roof assembly definitions (Vote: 8-2)..

Final Hearing Results

RB252-22 AS

RB254-22

Original Proposal

IRC: R302.2.3, R302.2.4, R902.1, R905.1.1, R905.2.1, R905.3.1, R905.3.2, R905.3.6, R905.4.1, R905.4.2, R905.4.4.1, R905.5.1, R905.5.2 R905.6.1, R905.6.2, R905.7.1, R905.7.1.1, R905.7.2, R905.8.1, R905.8.1.1, R905.8.2, R905.10.1, R905.16.1, R905.16.2, R905.17.1, R905.17.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

R302.2.3 Continuity. The fire-resistance-rated wall or assembly separating *townhouse units shall be continuous from the* foundation to the underside of the roof sheathing, *roof deck* or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures.*

R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where *roof decks* ~~surfaces~~ adjacent to the wall or walls are at different elevations and the higher *roof deck* is not more than 30 inches (762 mm) above the lower *roof deck*, the parapet shall extend not less than 30 inches (762 mm) above the lower *roof deck* ~~surface~~.

   Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the ~~roof decking~~ *roof deck* or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^5/_8$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the *roof deck* are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the highe *roof deck* is more than 30 inches (762 mm) above the lower *roof deck*. The common wall construction from the lower *roof deck* to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

R902.1 Roof covering materials. ~~Roofs~~ *Roof decks* shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the *roof deck* is less than 3 feet (914 mm) from a *lot line*. Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible *roof decks.*
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible *roof decks*.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible *roof decks*.

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 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 *roof 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 *roof deck* material, shall be applied over all joints in the *roof deck* ~~decking~~. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

R905.2.1 Sheathing requirements. Asphalt shingles shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed decks~~.

R905.3.1 ~~Deck~~ Sheathing requirements. Concrete and clay tile shall be installed ~~only~~ over ~~solid sheathing.~~ *wood structural panels* or solid lumber sheathing.

Exception: Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in *Seismic Design Categories* A, B and C.

R905.3.2 ~~Deck slope~~ Slope. Clay and concrete roof tile shall be installed on roof slopes of $2^1/_2$ units vertical in 12 units horizontal (25-percent slope) or greater. For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (25-percent slope) to 4 units vertical in 12 units horizontal (33-percent slope), double *underlayment* application is required in accordance with Section R905.3.3.

R905.3.6 Fasteners. Nails shall be corrosion resistant and not less than 11-gage [0.120 inch (3 mm)], $^5/_{16}$-inch (11 mm) head, and of sufficient length to penetrate the *roof deck* not less than $^3/_4$ inch (19 mm) or through the thickness of the *roof deck*, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2 mm). Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.

R905.4.1 ~~Deck~~ Sheathing requirements. *Metal roof shingles* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing ~~applied to a solid or closely fitted deck,~~ except where the roof covering is specifically designed to be applied to spaced lumber sheathing.

R905.4.2 ~~Deck slope~~ Slope. *Metal roof shingles* shall not be installed on roof slopes below 3 units vertical in 12 units horizontal (25-percent slope).

R905.4.4.1 Wind resistance of metal roof shingles. *Metal roof shingles* ~~applied~~ fastened to wood structural panels, solid lumber sheathing or closely-fitted lumber sheathing ~~a solid or closely fitted deck~~ shall be tested in accordance with ASTM D3161, FM 4474, UL 580 or UL 1897. *Metal roof shingles* tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum basic wind speed and the metal shingle packaging shall bear a *label* to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1.

R905.5.1 ~~Deck~~ Sheathing requirements. Mineral-surfaced roll roofing shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed roofs~~.

R905.5.2 ~~Deck slope~~ Slope. Mineral-surfaced roll roofing shall not be applied on roof slopes below 1 unit vertical in 12 units horizontal (8-percent slope).

R905.6.1 ~~Deck~~ Sheathing requirements. Slate shingles shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly~~

~~sheathed roofs.~~

R905.6.2 ~~Deck slope~~ Slope. Slate shingles shall be used only on slopes of 4 units vertical in 12 units horizontal (33-percent slope) or greater.

R905.7.1 ~~Deck~~ Sheathing requirements. Wood shingles shall be fastened to *wood structural panels*, solid lumber sheathing, or spaced lumber sheathing. ~~installed on solid or spaced sheathing~~. Where spaced lumber 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.

R905.7.1.1 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, *wood structural panels* or solid lumber sheathing is required on that portion of the *roof deck* requiring the application of an ice barrier.

R905.7.2 ~~Deck slope~~ Slope. Wood shingles shall be installed on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

R905.8.1 ~~Deck~~ Sheathing requirements. Wood shakes shall be fastened to *wood structural panels*, solid lumber sheathing, or spaced lumber sheathing. ~~used only on solid or spaced sheathing~~. Where spaced lumber 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 lumber 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.

R905.8.1.1 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, *wood structural panels* or solid lumber sheathing is required on that portion of the *roof deck* requiring an ice barrier.

R905.8.2 ~~Deck slope~~ Slope. Wood shakes shall only be used on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

R905.10.1 ~~Deck~~ Sheathing requirements. *Metal roof panel* roof coverings shall be fastened to *wood structural panels*, solid lumber sheathing, or ~~applied to solid or~~ spaced lumber sheathing, except where the roof covering is specifically designed to be applied to spaced supports.

R905.16.1 ~~Deck~~ Sheathing requirements. *Photovoltaic shingles* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing. ~~applied to a solid or closely-fitted deck~~, except where the roof covering is specifically designed to be applied over spaced lumber sheathing.

R905.16.2 ~~Deck slope~~ Slope. *Photovoltaic shingles* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

R905.17.1 ~~Deck~~ Sheathing requirements. *BIPV roof panels* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing. ~~applied to a solid or closely-fitted deck~~, except where the *roof covering* is specifically designed to be applied over spaced lumber sheathing.

R905.17.2 ~~Deck slope~~ Slope. *BIPV roof panels* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (17-percent slope) or greater.

Reason: The purpose of this proposal is to use common terminology throughout section 905 in regard to roof decks and sheathing. The subsections under 905 cover different roof coverings and are organized similar to each other, but with variation in titles. The IRC is a professional standard, but developed piece by piece in cycles. Every so often non glamorous code proposals are necessary to correlate the mess. We just have to wait for someone to take the time to do the work.
1) "Roof deck" has been defined in the IRC since the first draft over two decades ago. However, over time, proposals have used the term "deck" or "roof" in references that would fall under the defined term. Where "roof deck" is appropriate, it has been corrected in this

proposal.

2) Use of the term "solid sheathing" in the IRC is often misunderstood as implying "wood structural panel" and not permitting "lumber sheathing". "Spaced sheathing" in the IRC is not interpreted or understood consistently either. Many incorrectly believe this to be any "lumber sheathing" due to the inconsistencies of milled width and shrinkage that result in small gaps (1/8 to 1/4) between boards, "spaces". This incorrect interpretation has lead to many existing roof decks constructed with lumber sheathing to be unnecessarily re-sheathed with wood structural panel sheathing during roof replacement projects with asphalt shingles. This proposal clarifies three different lumber sheathing applications that affect different roof coverings.

"Spaced lumber sheathing". This term has a very specific meaning for wood shake and wood shingles. This is an installation method where the lumber boards are spaced upward of 10 inches on center and only function as nailing strips for the ends of the shingles. Spaced lumber sheathing, also referred to in the industry as "skip sheathing" is an older method of construction, but is still provided for in the IRC today. However, it is very important that the IRC be more specific in references to this sheathing method so the various provisions can be appropriately understood. It is the observation of this proponent that fewer professionals in the industry have the historical understanding of "spaced sheathing" and thus modern times require more clarification to support accurate intepretations. Please reference Sections R905.7.1 and 905.8.1 for applications of spaced sheathing.

"Solid lumber sheathing" and wood structural panel sheathing are now terms used in place of "solid sheathing" in order to clarify that this applies to both lumber sheathing and wood structural panels.

"closely-fitted lumber sheathing" is a term this proponent finds a little ambiguous and inconsistent, yet this proposal does not intend to challenge any existing intent or application. Therefore only "lumber" was added anywhere this term was used in order to stay consistent with the other installations of lumber sheathing.

3) The section titles for slope were both "Deck slope" and "Slope". This proponent simply chose one and it was "Slope". If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

4) The section titles for the "deck or sheathing requirements" were not consistent. Since these sections specifically discuss the different sheathing products and installations, this proponent chose "Sheathing requirements'. If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the current intent of the IRC roof covering applications and does not directly affect the cost of construction. However, it will reduce the cost of construction where the inconsistent terms are better understood and roof decks with lumber sheathing are no longer required to be re-sheathed due to inaccurate interpretations no longer occurring.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for townhouses as an extension of exterior walls or common walls separating townhouse units in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof decks adjacent to the wall or walls are at different elevations and the higher roof deck is not more than 30 inches (762 mm) above the lower roof deck, the parapet shall extend not less than 30 inches (762 mm) above the lower roof deck .

   Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof deck or sheathing is of noncombustible materials or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of / -inch (15.9 mm) Type X gypsum board is installed directly beneath the roof <u>deck</u> ~~decking~~ or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof deck are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof deck is more than 30 inches (762 mm) above the lower roof deck. The common wall construction from the lower roof deck to the underside of the higher roof deck shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

<u>**R905.7.1.1 Wood Structural Panels**. Wood structural panels used as sheathing for wood shingles shall be plywood that conforms to DOC PS1 and shall be identified by a grade mark or certificate of inspection issued by an approved agency.</u>

R905.7.1.~~1~~ <u>2</u> Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, wood structural panels or solid lumber sheathing is required on that portion of the roof deck requiring the application of an ice barrier

<u>**R905.8.1.1 Wood Structural Panels.** Wood structural panels used as sheathing for wood shakes shall be plywood that conforms to DOC PS1 and shall be identified by a grade mark or certificate of inspection issued by an approved agency.</u>

R905.8.1.~~1~~ <u>2</u> Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, wood structural panels or solid lumber sheathing is required on that portion of the roof deck requiring an ice barrier.

Committee Reason: The committee decided that the modification corrects "decking" to "deck" and adds new sections for Wood Structural Panels. The modification also adds a reasonable reference to DOC PS1. In addition, the committee determined that the proposal as modified provides good reorganization and simplification to the sections. The proposal also brings consistency to the code requirements (Vote: 10-0).

Public Comments

Public Comment 2

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org) requests As Submitted

Commenter's Reason: The inclusion of Sections R905.7.1.1 and R905.8.1.1 "Wood Structural Panels" was recommended by the Cedar Shake and Shingle Bureau during the Committee Action Hearings. Based on their installation guidelines "plywood" is not the only material option for these applications and OSB was incorrectly struck from the proposal. Although plywood might be recommended for roof sheathing in wood shingle and shake applications, OSB is included in the installation manual and should not be deleted as an acceptable material.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Clarification of requirements and more consistent terminology have no cost impact.

Public Comment 3

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org) requests As Submitted

Commenter's Reason: The change proposal that has been approved as modified includes a limitation of wood structural panel roof sheathing to plywood only for wood shingles (Section R905.7.1.1) and wood shakes (Section R905.8.1.1). This limitation is inconsistent with the definition of wood structural panels in the IRC, as specified in the approved parent Section R905.7.1, which states “Wood shingles shall be fastened to <u>wood structural panels</u>, solid lumber sheathing, or spaced lumber sheathing.” and parent Section R905.8.1, which states “Wood shakes shall be fastened to <u>wood structural panels</u>, solid lumber sheathing, or spaced lumber sheathing.”

The modification was introduced at the last Committee Action Hearing by the Cedar Shake & Shingle Bureau (CSSB, https://www.cedarbureau.org/). In the “Installation FAQ” of the CSSB website (https://www.cedarbureau.org/literature-education/installation-faq/) under “Oriented Strand Board,” it is not the CSSB recommendation to exclude the installation of cedar shakes and shingles over oriented strand board as a wood structural panel by definition.

The original change proposal without the modification correctly made proper changes. Therefore, it is requested that RB254-22 be approved as submitted (without the modification) to correct the unnecessary confusion induced by the modification.

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 clarifies the intent of the code and removes the unnecessary restriction of wood structural panel sheathing types.

Final Hearing Results	
RB254-22	AS

RB258-22

Original Proposal

IRC: R905.1.1
Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety

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 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 <u>and design wind speed</u> ~~areas where wind design is not required in accordance with Figure R301.2.1.1~~ shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2.1.1. Underlayment shall be attached in accordance with Table R905.1.1(3) <u>for the applicable roof covering and design wind speed</u>.

Reason: This proposal corrects an error in the 2021 IRC that technically was corrected during the 2019 cycle but was correlated incorrectly by staff. The public comment to RB274 did two things. It added the exception back to this section for a fully adhered underlayment that was mistakenly deleted by the original proponent. It also corrected an error in Exception 2 related to underlayment types permitted over the 4-inch-wide strips of self-adhering polymer modified bitumen membrane. However, when RB274-19 was correlated with RB275-19, the correction approved in the public comment to RB274-19 was not implemented in the printed version of the 2021 IRC. Staff was notified and a request was made to include it as an errata. However, at this point, we have not received clear confirmation from staff either way about the status of this item. This code change clarifies the underlayment types permitted, underlayment application and underlayment fastening for Exception 2 as staff apparently is not considering this an errata.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of a code change that was previously approved in the 2019 code cycle.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal fixes the incorrect reference to design wind speed. In addition, the proposal clarifies the underlayment types permitted, underlayment application, and underlayment fastening for Exception 2 (Vote: 9-0).

Final Hearing Results	
RB258-22	AS

RB259-22

Original Proposal

IRC: TABLE R905.1.1(1)

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

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 D226 Type II ASTM D4869 Type III or Type IV
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 D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	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
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	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
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 D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	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 Type IV

For SI: 1 mile per hour = 0.447 m/s.

Reason: Underlayment options for photovoltaic shingles in Table R905.1.1(1) are updated to include ASTM D226 saturated felts. This aligns options in the International Residential Code with the ones already present in the International Building Code in Table 1507.1.1(1). In areas where wind design is required, ASTM D226 Type II is added as an alternative to ASTM D4869, Types III and IV, This is technically justified because the minimum net masses of saturated felt, saturant, and desaturated felt are equivalent for both ASTM D226 Type II and ASTM D4869 Type IV. Equivalent composition can be expected to yield equivalent results. In areas where wind design is not required, ASTM D226 Types I and II are proposed for addition. Felts meeting D226, Type I exceed the minimum saturated felt, saturant, and desaturated felt net masses of D4869 Type I, making both D226 Types I and II suitable for recognition as an alternative to ASTM D4869 Types I, II, III, and IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of underlayment options is not expected to affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal provides an additional underlayment options for photovoltaic shingles adding a reference to ASTM D226 Asphalt-Saturated Organic Felt in as an approved underlayment (Vote: 9-0).

Final Hearing Results

RB259-22	AS

RB260-22

Original Proposal

IRC: R905.1.1, TABLE R905.1.1(1)

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 ASTM D2626 Type I and ASTM D6380 Class M 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 D226 Type II ASTM D4869 Type III or Type IV
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 D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	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
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	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
Wood shakes on solid sheathing	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 on solid sheathing	R905.10	Manufacturer's instructions 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
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

Reason: This code change proposal is a clarification and clean-up of Section R905.1.1 and Table R905.1.1(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 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 Metal Roof Shingle 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 R905.8.4.

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: 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, D6757 ASTM D2626 ~~Type I and~~ or ASTM D6380 Class M 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

Portions of table not shown remain unchanged.

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 D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 ~~Type I~~ ASTM D6380 Class M	ASTM D226 Type II
Metal roof shingles	R905.4	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
Mineral-surfaced roll roofing	R905.5	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

Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	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
Wood shakes on solid sheathing	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 on solid sheathing	R905.10	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
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

Committee Reason: The committee decided that the modification correctly deletes Type I when referencing ASTM D2626 Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing. In addition, the committee determined that the proposal, as modified, clarifies underlayment requirements and adds ASTM D2626 to Metal panels on solid sheathing (Vote: 10-0).

Final Hearing Results

RB260-22	AM

RB261-22

Original Proposal

IRC: SECTION 202, R324.5.1, R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), R905.16, R905.16.1, R905.16.2, R905.16.4, R905.16.5, R905.16.6, TABLE R905.16.6,

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 Residential Code

Delete without substitution:

~~**[RB] PHOTOVOLTAIC SHINGLES.** A *roof covering* that resembles shingles and 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:

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*~~ <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 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 D226 Type II ASTM D4869 Type III or Type IV
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 D226 Type II ASTM D4869 Type III or Type IV

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
Mineral-surfaced roll roofing	R905.5	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
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	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
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 D226 Type II ASTM D4869 Type III or Type IV
~~Photovoltaic shingles~~ BIPV roof coverings	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

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 parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 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.	Underlayment shall be two layers applied in the following manner: 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. 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.
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 not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, 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 not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: 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. 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.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be two layers applied in the following manner: 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.
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		
~~Photovoltaic shingles~~ BIPV roof coverings	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 parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 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.	Underlayment shall be two layers applied in the following manner: 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. 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 SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

R905.16 ~~Photovoltaic~~ BIPV shingles. The installation of *~~photovoltaic~~* BIPV shingles shall comply with the provisions of this section, Section R324 and NFPA 70.

R905.16.1 Deck requirements. *~~Photovoltaic~~* BIPV shingles shall be applied to a solid or closely-fitted deck, except where the roof covering is specifically designed to be applied over spaced sheathing.

R905.16.2 Deck slope. *~~Photovoltaic~~* BIPV shingles shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

R905.16.4 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.

R905.16.5 Attachment. ~~*Photovoltaic*~~ BIPV shingles shall be attached in accordance with the manufacturer's installation instructions.

R905.16.6 Wind resistance. ~~*Photovoltaic*~~ BIPV shingles shall comply with the classification requirements of Table R905.16.6 for the appropriate maximum basic wind speed.

TABLE R905.16.6 Classification of ~~Photovoltaic~~ BIPV Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult}, FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD}, FROM TABLE R301.2.1.3 (mph)	UL 7103 SHINGLE CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

For SI: 1 mile per hour = 1.609 kph.

R324.5.1 ~~Photovoltaic~~ BIPV shingles. ~~Photovoltaic~~ BIPV shingles shall comply with Section R905.16.

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 9 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: The committee determined that the proposal aligns the text with the change to the definition of BIPV systems. The proposal also corrects the terminology related to BIPV used as roof assemblies and roof coverings (Vote: 10-0)

Final Hearing Results

RB261-22	AS

RB262-22

Original Proposal

IRC: R905.1.2

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2, an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of *underlayment* cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building. ~~On roofs with slope equal to or greater than 8 units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.~~

Exception: Detached *accessory structures* not containing conditioned floor area.

Reason: Ice dams form at or downslope of the transition between above freezing and below freezing sections of the roof deck. Warm air rising from the interior of the building into the attic space may raise the roof deck temperature and cause snow or ice on the roof to melt, run downslope, and possibly refreeze if the roof deck temperature downslope is low enough. Building characteristics, including roof slope, determine where that transition occurs and affect whether and where an ice dam forms.
The special guideline for roofs at or above 8:12 slope overlooks many building construction variations. This proposal strikes the special language for roofs above 8:12 slope to ensure the minimum requirement causes installation of the ice dam protective membrane over an appropriate portion of the roof that includes extension within the exterior wall line. The existing language could create situations where the ice dam membrane terminates well before the location on the roof deck where there is a transition from above freezing to below freezing conditions, which could allow ice dam formation at an area not covered by an ice barrier and lead to water infiltration into the building.

Additionally, the existing language can be interpreted in multiple fashions due to use of the word "also" in the last sentence of Section R905.1.2, suggesting there may be a requirement for two layers of ice barrier for roofs 8:12 and higher in slope.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
If people interpret the existing provisions to require two layers of ice barrier for slopes 8:12 and above, one that runs at least 36" parallel to slope and one that runs at least 24" inside the exterior wall line, this proposal could result in a decrease in cost of construction by permitting one layer that runs at least 24" inside the exterior wall line. If people interpret the existing provisions to require only a single layer running at least 36" parallel to the slope, this proposal could result in an increase in cost of construction for situations in which more than a single 36" width of ice barrier will be required to reach 24" inside the exterior wall line. On balance for all projects, the proposal is expected to be approximately cost neutral.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2, an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of underlayment cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building.

On roofs with slope equal or greater than 8 units vertical in 12 units horizontal, (67 percent slope), the ice barrier membrane shall ~~also~~ be applied not less than 36" (914mm) measured along the roof slope from the eave edge of the building.

Committee Reason: The committee concluded that the modification restores the language deleted by this proposal and only deletes "also" to avoid confusion. Therefore, the committee approved this proposal as modified due to the fact that it clarifies the requirements that the ice barrier membrane shall be applied not less than 36" (914mm) measured along the roof slope from the eave edge of the building (Vote: 10-0).

Final Hearing Results

RB262-22	AM

RB264-22

Original Proposal

IRC: R905.2.8.2

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.2.8.2 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 R905.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing, complying with ASTM D3909 or ASTM D6380 Class M, 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 (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380 and not less than 36 inches wide (914 mm) or valley lining as described in Item 1 or 2 shall be permitted. Self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970and not less than 36 inches (914 mm) wideshall 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 IRC. 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: The committee approved this proposal considering the fact that the proposal incorporates the minimum width of at least 36" based on ASTM D1970 (Vote: 10-0).

Final Hearing Results

RB264-22	AS

RB265-22

Original Proposal

IRC: R905.2.8.4

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.2.8.4 Other flashing. Flashing against a vertical front wall, as well as soil stack, vent pipe and chimney flashing, shall be applied in accordance with 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 IRC Chapter 9 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: The committee concluded that the proposal reasonably removes the word "printed" where it is used in conjunction with "instructions.". Moreover, this removal permits alternative methods for providing instructions, including digital formats (Vote: 10-0).

Final Hearing Results

RB265-22	AS

RB266-22

Original Proposal

IRC: R905.3.6 (New), R905.5.6 (New), R905.6.5 (New), R905.6.5, TABLE R905.6.5, R905.7.5 (New), R905.7.5, TABLE R905.7.5(1), TABLE R905.7.5(2), R905.8.6 (New), R905.8.6, TABLE R905.8.6, R905.9.4 (New), R905.10.5 (New), R905.11.4 (New), R905.12.4 (New), R905.13.4 (New), R905.14.4 (New), R905.15.4 (New), R905.17.7 (New), ASTM Chapter 44 (New)

Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2021 International Residential Code

Add new text as follows:

R905.3.6 Wind resistance of concrete and clay tile. In regions where wind design is required in accordance with Figure R301.2.1.1, wind loads on concrete and clay tile shall be determined in accordance with Section 1504.3 of the International Building Code. In regions where wind design is not required in accordance with Figure R301.2.1.1, concrete and clay tiles shall be attached in accordance with this Sections R905.3.7 and R905.3.8.

R905.5.6 Wind resistance of mineral-surfaced roll roofing. Mineral-surfaced roll roofing shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.6.5 Wind resistance of slate shingles. Slate shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, slate shingles shall be attached in accordance with Section R905.6.6.

Revise as follows:

R905.6.6 ~~R905.6.5~~ Application. Minimum headlap for slate shingles shall be in accordance with TableR905.6.6 ~~R905.6.5~~ . Slate shingles shall be secured to the roof with two fasteners per slate. Slate shingles shall be installed in accordance with this chapter and the manufacturer's instructions.

TABLE R905.6.6 ~~R905.6.5~~ SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 ≤ slope < 8:12	4
8:12 ≤ slope < 20:12	3
Slope ≥ 20:12	2

For SI: 1 inch = 25.4 mm.

Add new text as follows:

R905.7.5 Wind resistance of wood shingles. In regions where wind design is required in accordance with Figure R301.2.1.1, Wood shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, wood shingles are permitted to be attached in accordance with Section R905.7.6.

Revise as follows:

R905.7.6 ~~R905.7.5~~ Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.6(1) ~~R905.7.5(1)~~. Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.6(2) ~~R905.7.5(2)~~. Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

TABLE R905.7.6(1) ~~R905.7.5(1)~~ WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	3$^3/_4$	5
		No. 2	3$^1/_2$	4
		No. 3	3	3$^1/_2$
	18	No. 1	4$^1/_4$	5$^1/_2$
		No. 2	4	4$^1/_2$
		No. 3	3$^1/_2$	4
	24	No. 1	5$^3/_4$	7$^1/_2$
		No. 2	5$^1/_2$	6$^1/_2$
		No. 3	5	5$^1/_2$

For SI: 1 inch = 25.4 mm.

TABLE R905.7.6(2) ~~R905.7.5(2)~~ NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLES

PRODUCT TYPE	NAIL TYPE, MINIMUM LENGTH AND SHANK DIAMETER (inches)
Shakes	
18″ straight-split	5d box 1$^3/_4$″ × 0.080
18″ and 24″ handsplit and resawn	6d box 2″ × 0.099
24″ taper-split	5d box 1$^3/_4$″ × 0.080
18″ and 24″ tapersawn	6d box 2″ × 0.099
Shingles	
16″ and 18″	3d box 1$^1/_4$″ × 0.076
24″	4d box 1$^1/_2$″ × 0.076

For SI: 1 inch = 25.4 mm.

Add new text as follows:

R905.8.6 Wind resistance of wood shakes. In regions where wind design is required in accordance with Figure R301.2.1.1, Wood shakes shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, wood shakes are permitted to be attached in accordance with Section R905.8.7.

Revise as follows:

R905.8.7 ~~R905.8.6~~ Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than 1$^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.7 ~~R905.8.6~~. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.6(2) ~~R905.7.5(2)~~. Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than $^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

TABLE R905.8.7 ~~R905.8.6~~ WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)
			4:12 pitch or steeper
Shakes of naturally durable wood	18	No. 1	$7^{1}/_{2}$
	24	No. 1	10[a]
Preservative-treated tapersawn shakes of Southern Yellow Pine	18	No. 1	$7^{1}/_{2}$
	24	No. 1	10
	18	No. 2	$5^{1}/_{2}$
	24	No. 2	$7^{1}/_{2}$
Taper-sawn shakes of naturally durable wood	18	No. 1	$7^{1}/_{2}$
	24	No. 1	10
	18	No. 2	$5^{1}/_{2}$
	24	No. 2	$7^{1}/_{2}$

For SI: 1 inch = 25.4 mm.

a. For 24-inch by $^{3}/_{8}$-inch handsplit shakes, the maximum exposure is $7^{1}/_{2}$ inches.

Add new text as follows:

R905.9.4 Wind resistance of built-up roofs. Built-up roof coverings shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.10.5 Wind resistance of metal roof panels. Metal roof panels shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). Metal roof panels applied to a solid or closely fitted deck shall be tested for wind resistance in accordance with FM 4474, UL 580, or UL 1897. Structural standing seam metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592 or FM 4474. Structural through-fastened metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592, FM 4474 or UL 580.

Exceptions:

1. Metal roofs constructed of cold-formed steel shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2210.1 of the International Building Code.
2. Metal roofs constructed of aluminum shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2002.1 of the International Building Code.

R905.11.4 Wind resistance of modified bitumen roofing. Modified bitumen roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.12.4 Wind resistance of thermoset single-ply roofing. Thermoset single-ply roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.13.4 Wind resistance of thermoplastic single-ply roofing. Thermoplastic single-ply roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.14.4 Wind resistance of sprayed polyurethane foam roofing. Sprayed polyurethane foam roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.15.4 Wind resistance of liquid-applied roofing. Liquid-applied roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.17.7 Wind resistance of BIPV roof panels. BIPV roof panels shall be tested in accordance with UL 1897 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E1592-2005(2017)	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

Reason: This proposal is one of two proposals intended to clarify the wind limitations in the IRC. Section R301.2.1.1 intends to limit the applicability of the IRC to areas where wind design is not required in accordance with Figure R301.2.1.1. However, Chapter 9 contains high wind requirements for asphalt, metal, and photovoltaic shingles and for underlayment in wind design required regions, but for no other roof coverings. While Section R905.1 states that unless otherwise specified, roof coverings have to resist the component and cladding loads specified in Table R302(2), that requirement is not necessarily correct for all roof coverings. Prescriptive attachment methods are provided for concrete and clay tile but the code does not specify any wind limitations on the use of this prescriptive method.
Therefore, new sections are proposed for many roof coverings that specifically addresses the wind limitations in the IRC for roof covering attachment and specifies the performance requirements for roof coverings in wind design required regions. Where prescriptive attachment methods are provided, the proposal limits their use to areas where wind design is not required. The performance requirements specified are consistent with Section 1504 in the IBC. This proposal is not intended to change any technical requirements in the IRC related to wind design. It is intended to simply clarify the wind requirements for roof coverings in the IRC.

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

Public Hearing Results

Committee Action **As Modified**

Committee Modification: ~~**R905.6.5 Wind resistance of slate shingles.**Slate shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, slate shingles shall be attached in accordance with Section R905.6.6.~~

TABLE R905.6.~~6~~ 5 SLATE SHINGLE HEADLAP

Portions of table not shown remain unchanged.

R905.17.7 Wind resistance of BIPV roof panels.BIPV roof panels shall be tested in accordance with~~UL 1897~~ UL 7103 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

Committee Reason: The committee decided that the modification corrects the UL standard from UL 1897 to UL 7103. The modification also deletes the unnecessary requirements for wind resistance of slate shingles since it has been addressed in a previous code change. The committee determined that the proposal as modified provides good previsions for wind resistance. In addition, the proposal adds a standard for a test method for structural performance of sheet metal roof and siding systems by uniform static air pressure difference (Vote: 10-0).

Final Hearing Results

RB266-22 AM

RB267-22

Original Proposal

IRC: TABLE R905.3.7

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

SHEATHING	ROOF SLOPE	NUMBER OF FASTENERS
Solid without battens	All	One per tile
Spaced or solid with battensand slope < 5:12	Fasteners not required slope < 5:12	Fasteners not required
Spaced sheathing without battens	5:12 ≤ slope < 12:12	One per tile/every other row
	12:12 ≤ slope < 24:12	One per tile

Reason: At first glance, the data in the row “spaced or solid with battens and slope <5:12” appears to be shifted to the left and not in the correct columns. In researching, this table has been in this form since the 2000 IRC. This proposals suggests that the slope conditions for this row be placed under the column titled “roof slope” and the number of fasteners required should be under the column titled “number of fasteners”.

In reviewing the Concrete and Clay Roof Tile Installation Manual (2015-latest edition) by the Tile Roofing Institute and Western States Roofing Contractors Association, Table IB, it would appear that this shift of data in the IRC table is supported. This can be viewed online at this link: https://tileroofing.org/wp-content/uploads/TRI-Installation-Guide-2015-1.pdf

The clay and concrete tile industry is welcome to further refine this proposal with floor modifications and/or public comments. The goal of this proposal is simply to make the presentation of the data in the cells align sensibly with the column titles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is editorial and does not change the application of the IRC provisions.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal corrects the text in Table R905.3.7 regarding the slope conditions and the number of fasteners (Vote: 10-0)

Final Hearing Results

RB267-22 AS

RB268-22

Original Proposal

IRC: R905.6.5 (New), TABLE R905.6.5 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Add new text as follows:

R905.6.5 Wind resistance of slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate shingle packaging shall bear a label indicating compliance with ASTM D3161 and the required classification in Table R905.6.5.

TABLE R905.6.5 CLASSIFICATION OF SLATE SHINGLES TESTED IN ACCORDACNE WITH ASTM D3161

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult}, FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{asd}, FROM TABLE R301.2.1.3 (mph)	ASTM D3161 CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

For SI: 1 mph=0.447
m/s

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 IRC. 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. A new table is added, Table R905.6.5 providing the required wind resistance classification based on the maximum ultimate design wind speed, V_{ult}, or maximum basic wind speed, V_{asd}. 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: The committee determined that the proposal adds needed requirements for wind resistance of slate shingles. In addition, the proposal reference ASTM D3161 and its classification designations (Vote: 10-0).

Final Hearing Results

RB268-22 AS

RB269-22

Original Proposal

IRC: R905.7.1
Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Residential Code

Revise as follows:

R905.7.1 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) 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 Sections R806.1, R806.2, R806.3 and R806.4. 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: The committee approved this proposal considering the fact that the proposed text ensures the configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation. The committee recommended for the proponent to look into clarifying "shall not be backed with materials" during the public comment phase (Vote: 10-0).

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 Residential Code

R905.7.1 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) 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 Sections R806.1, R806.2, R806.3 and R806.4. 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 (10-0), 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

RB269-22	AMPC1

RB270-22

Original Proposal

IRC: R905.7.5, ASTM Chapter 44

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R905.7.5 Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer’s instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D <u>or ASTM A641 Class 3S</u> (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than$^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer’s installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~–09a(2014)~~ <u>2019</u> Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: 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./ft². 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/ft².
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.

Bibliography: ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples
ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not add or reduce cost. The proposal aligns with current industry practices

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal incorporates updated requirements based on ASTM A641/A641M-2019 specification for Zinc-coated (Galvanized) carbon steel wire. The committee's approval is consistent with the committee's previous actions (Vote: 10-0).

Final Hearing Results	
RB270-22	AS

RB271-22

Original Proposal

IRC: R905.8.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Residential Code

Revise as follows:

R905.8.1 Deck requirements. Wood shakes shall be ~~used only~~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, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When 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 Sections R806.1, R806.2, R806.3 and R806.4. The shakes shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.

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 shake 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: The committee's approval is consistent with the committee's previous action on RB269-22. See RB269-22 committee's reason statement (Vote: 10-0).

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 Residential Code

R905.8.1 Deck requirements. Wood shakes 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, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When 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 Sections R806.1, R806.2, R806.3 and R806.4. 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 (10-0), 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

RB271-22	AMPC1

RB272-22

Original Proposal

IRC: R905.8.6, ASTM Chapter 44
Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R905.8.6 Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D or ASTM A641 Class 3S (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths$^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than$^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~-09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: 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./ft². 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/ft².
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.

Referenced standard

ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples

ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not add or reduce to cost. Proposal aligns with current industry practice.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal incorporates updated requirements based on ASTM A641/A641M-2019 specification for Zinc-coated (Galvanized) carbon steel wire. The committee's approval is consistent with the committee's previous actions (Vote: 10-0).

Final Hearing Results

RB272-22	AS

RB274-22

Original Proposal

IRC: R905.12, R905.12.1, R905.12.2, TABLE R905.12 (New), R905.12.3, R905.13, R905.13.1, R905.13.2, R905.13.3

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.12 ~~Thermoset single~~ Single-ply roofing. The installation of ~~thermoset single-ply roofing~~ *single-ply membrane roof coverings* shall comply with the provisions of this section.

R905.12.1 Slope. ~~Thermoset *single*~~*Single-ply membrane* ~~roofs~~ *roof coverings* shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) for drainage.

R905.12.2 Material standards. ~~Thermoset single~~*Single-ply membrane roof coverings* shall comply with ~~ASTM D4637 or ASTM D5019~~ the material standards in Table R905.12.

Add new text as follows:

TABLE R905.12 SINGLE-PLY ROOFING MATERIAL STANDARDS

MATERIAL	MATERIAL STANDARD
Chlorosulfanted polyethylene (CSPE) or polyisobutylene (PIB)	ASTM D5019
Ethylene propylene diene monomer (EPDM)	ASTM D4637
Ketone Ethylene Ester (KEE)	ASTM D6754
Polyvinyl chlorine (PVC) or (PVC/KEE)	ASTM D4434
Thermosplastic polyolefin (TPO)	ASTM D6878

Revise as follows:

R905.12.3 Application. ~~Thermoset single~~ *Single-ply membrane roof* ~~*roofs*~~*coverings* shall be installed in accordance with this chapter and the manufacturer's installation instructions.

~~**R905.13 Thermoplastic single-ply roofing.** The installation of thermoplastic single-ply roofing shall comply with the provisions of this section.~~

~~**R905.13.1 Slope.** Thermoplastic *single-ply membrane* roofs shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope).~~

~~**R905.13.2 Material standards.** Thermoplastic single-ply roof coverings shall comply with ASTM D4434, D6754 or D6878~~.

~~**R905.13.3 Application.** Thermoplastic single-ply roofs shall be installed in accordance with this chapter and the manufacturer's instructions.~~

Reason: This code change proposal is intended to clarify the code's requirements regarding single-ply membrane roof coverings. Currently, requirements for thermoset single-ply roofing are address in Section R905.12 and thermoplastic single-ply roofing are addressed in Section R905.13. Other than the material standards for specific membrane types, the requirements are identical in both sections.

This code change proposal combines the two sections into a new section, Section R905.12-Single-ply Roofing and combines the material standards in a new table, Table R905.12-Single-ply Roofing Material Standards.

This code change proposal makes no changes to the code's requirements for single-ply membrane roof coverings; it is simply a reformat of the code's already existing requirements.

This same consolidation and new table has already been incorporated into IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this code change proposal makes no changes to the code's technical requirements, there is no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal reorganizes and clarifies requirements for single-ply membrane roof coverings. The committee also agreed with the combination of Section R905.12 for thermoset single roofing and Section R905.13 for thermoplastic single-ply roofing. In addition, The proposal also adds material standards in Table R905.12 (Vote: 9-0)

Final Hearing Results

RB274-22	AS

RB277-22

Original Proposal

IRC: TABLE R906.2, ASTM Chapter 44 (New)

Proponents: Greg Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

TABLE R906.2 MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VI
Expanded polystyrene	ASTM C578
Extruded polystyrene board	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
Mineral wool board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208

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: The committee approved this proposal considering the fact that the proposal adds needed ASTM C1902-20 for cellular glass insulation used in building and roof applications to Table R906.2 for cellular glass board (Vote: 10-0).

Final Hearing Results

RB277-22	AS

RB280-22

Original Proposal

IRC: SECTION R908 (New), R908.1 (New), R908.2 (New), TABLE R908.2 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Add new text as follows:

SECTION R908 ROOF COATINGS

R908.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section R902, R904 and this section. *Roof coatings* shall be installed in accordance with the manufacturer's installation instructions.

R908.2 Material standards. *Roof coating* materials shall comply with one of the standards in Table R908.2.

TABLE R908.2 ROOF COATING MATERIAL STANDARDS

COATING MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694
Moisture-cured polyurethane coating	ASTM D6947

Reason: This code change proposal provides guidance to building officials and users of the code regarding the use of roof coatings. While the IRC already provides a definition for the term "roof coating" and a number of material standards for roof coating products are already referenced in the various roof covering sections of the code, the code currently provides little guidance regarding roof coating use.
This code change proposal adds a new section, Section R908-Roof Coatings, specific to roof coating used on roof coverings. The new section requires roof coating use to comply with the code's fire classification requirements, material requirements and the specific material standard for the roof coating product being used. Also, the installation is required to comply with the manufacturer's installation instructions.

The material standards for the roof coating products included in the table are already included elsewhere in Chapter 9.

This new code section is similar to Section 1509-Roof Coatings that first appears in IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal clarifies the code's requirements regarding the use of roof coatings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal considering the fact that the proposal provides guidance for roof coatings. Although the code already defines the term "roof coating" more guidance is needed for the code users. The committee action is consistent with the committee action on RB274-22 (Vote: 10-0).

Final Hearing Results

RB280-22	AS

RB281-22

Original Proposal

IRC: R908.3
Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings 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 R905 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 R905.1.1(1), Table R905.1.1(2),and Table R905.1.1(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.
   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 IRC. 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 9, 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 R908.3 requires 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 IRC 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 R905.1.1(1), R905.1.1(2), and R905.1.1(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: R908.3 Roof replacement. Roof replacement shall include the removal of existing layers of roof coverings 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 R905 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 R905.1.1(1), Table R905.1.1(2),and Table R905.1.1(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.
   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: The committee determined that the modification clarifies by adding "new" to the self-adhered underlayment manufacturer. The modification also corrects the "self-adhered" to "new ice barrier". The committee concluded that the proposal, as modified, provides good material guidance and evaluation for roof replacement (Vote: 10-0).

Final Hearing Results

RB281-22	AM

RB283-22

Original Proposal

IRC: R1001.11

Proponents: James Buckley, Buckley Rumford Co., MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1001.11 Fireplace clearance. Wood beams, joists, studs and other *combustible material* shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except <u>for noncombustible insulation or</u> to provide fireblocking in accordance with Section R1001.12.

Exceptions:

1. Masonry fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry fireplaces are part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible *trim* and the edges of sheathing materials such as wood siding, flooring and gypsum board shall be permitted to abut the masonry fireplace sidewalls and hearth extension in accordance with Figure R1001.11, provided such combustible *trim* or sheathing is not less than 12 inches (305 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or *trim* is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such *combustible materials* are not placed within 6 inches (152 mm) of a fireplace opening. *Combustible material* within 12 inches (306 mm) of the fireplace opening shall not project more than $^{1}/_{8}$ inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Reason: Studies have shown that the heat transferred through an insulated space is less than through an airspace because the heat transfer in air is by convection - not conduction. see engineering report at https://www.rumford.com/articleairspace.html

Bibliography: See engineering report at https://www.rumford.com/articleairspace.html

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides an opting to include noncombustible insulation but it is not required.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R1001.11 Fireplace clearance. Wood beams, joists, studs and other combustible material shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except for ~~noncombustible insulation~~ <u>noncombustible material</u> or to provide fireblocking in accordance with Section R1001.12.

Exceptions:

1. Masonry fireplaces listed and labeled for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's instructions are permitted to have combustible material in contact with their exterior surfaces

2. Where masonry fireplaces are part of masonry or concrete walls, combustible materials shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible trim and the edges of sheathing materials such as wood siding, flooring and gypsum board shall be permitted to abut the masonry fireplace sidewalls and hearth extension in accordance with Figure R1001.11, provided such combustible trim or sheathing is not less than 12 inches (305 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or trim is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such combustible materials are not placed within 6 inches (152 mm) of a fireplace opening. Combustible material within 12 inches (306 mm) of the fireplace opening shall not project more than / inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Committee Reason: The committee concluded that the proposed modification correctly changed "noncombustible insulation" to "noncombustible material". The committee decided that the modified proposal incorporates the allowance for noncombustible material without adding a reference to other sections to make it easier for the code users (Vote: 9-1).

Final Hearing Results	
RB283-22	AM

RB284-22

Original Proposal

IRC: R1001.11

Proponents: James Buckley, Buckley Rumford Co., MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1001.11 Fireplace clearance. Wood beams, joists, studs and other *combustible material* shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except to provide fireblocking in accordance with Section R1001.12.

Exceptions:

1. Masonry fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry fireplaces are part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible *trim* and the edges of sheathing materials such as wood siding, flooring and gypsum board shall be permitted to abut the masonry fireplace sidewalls and hearth extension in accordance with Figure R1001.11, provided such combustible *trim* or sheathing is not less than ~~12 inches (305 mm)~~ 8 inches (203 mm) from the inside surface of the nearest firebox lining. Where the fireplace opening is 6 square feet (0.6 m2) or larger such combustible or sheathing shall be permitted to abut the masonry fireplace sidewalls and hearth extension provided such combustible or sheathing is not less than 12 inches (305 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or *trim* is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such *combustible materials* are not placed within 6 inches (152 mm) of a fireplace opening. *Combustible material* within 12 inches (306 mm) of the fireplace opening shall not project more than $^1/_8$ inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Reason: To make this section of code consistent with Section R1001.10. If a fireplace with an opening 6 square feet or smaller is built with the hearth extension only 8" beyond each side of the fireplace opening, as is permitted by R1001.10, then the flooring and trim cannot abut the hearth extension if it must be 12 inches from the inside surface of the firebox lining.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is just a change in required dimensions which will cost nothing.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee approved this proposal considering the fact that the proposal makes Section R1001.11 consistent with Section R1001.10 (Vote: 10-0).

Final Hearing Results

RB284-22	AS

RB287-22

Original Proposal

IRC: R1003.18

Proponents: James Buckley, Buckley Rumford Co., MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the building or within the exterior wall of the building shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry chimneys are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than 12 inches (305 mm) from the inside surface of the nearest flue lining.
3. ~~Exposed combustible *trim* and the edges of sheathing materials, such as wood siding and flooring,~~Combustible materials shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible~~trim or sheathing~~ material is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf - supporting the change from 12" to 8" in 2013 (RB458 - 13) compared an 8" thick chimney in contact with a combustible frame wall to a code-compliant 4" masonry wall plus 2" of air space to the framing and found the 8" thick masonry wall in contact with combustible framing was safer. There is no reason to limit the requirement for 8" thick chimney walls to "Exposed combustible trim and the edges of sheathing materials, such as wood siding and flooring".

Bibliography: Engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is just a clarification consistent with testing.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: The committee determined that the proposal provides good clarification for Section R1003.18, Exception #3. The committee approval was based on the submitted engineering study for eight-inch thick Masonry chimney test report (Vote: 9-1).

Final Hearing Results

RB287-22	AS

RB288-22

Original Proposal

IRC: R1003.18

Proponents: James Buckley, Buckley Rumford Co., MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the building or within the exterior wall of the building shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry chimneys are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than ~~12 inches (305 mm)~~ 8 inches (203 mm) from the inside surface of the nearest flue lining.
3. Exposed combustible *trim* and the edges of sheathing materials, such as wood siding and flooring, shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible trim or sheathing is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf - supporting the change from 12" to 8" in Exception 3 in 2013 (RB458 - 13) compared an 8" thick chimney in contact with a combustible frame wall to a code-compliant 4" masonry wall plus 2" of air space to the framing and found the 8" thick masonry wall in contact with combustible framing was safer. This is just a special case. Keeping combustibles at least 8"of solid masonry away from the inside surface of the nearest flue lining to make Exception 2 consistent with Exception 3.

Bibliography: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a change in dimension only that will cost nothing.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposed change is rational, it reduces burden, and consistent with the code requirements (Vote: 10-0).

Final Hearing Results

RB288-22 AS

RB289-22

Original Proposal

IRC: R1004.4
Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

R1004.4 Unvented gas log heaters. An unvented gas log heater <u>or a fireplace insert</u> shall not be installed in a factory-built fireplace unless the fireplace system has been specifically tested, *listed* and *labeled* for such use in accordance with UL 127.

Reason: An unvented gas log heater is not permitted in a factory-built fireplace, unless the fire place system has been specifically tested, listed and labeled for such use in accordance with UL 127. This is because the addition of an unvented gas log heater within a firebox can alter the temperatures on the outside of the factory-built fireplace, which are typically installed with zero clearances to combustible materials. The same fire safety concern applies to the addition of a fireplace insert within a factory-built fireplace.

Cost Impact: The code change proposal will increase the cost of construction
It is possible that listed fireplace inserts might be slightly more expensive than unlisted units, but we are not aware of specific cost differences between the two.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal addresses a gap in the code for fireplace insert. In addition, the proposal clarifies that the same fire safety concern applies to the addition of a fireplace insert within a factory-built fireplace (Vote: 10-0).

Final Hearing Results

RB289-22 AS

RB293-22

Original Proposal

IRC: AF103.3

Proponents: David Kapturowski, Spruce Environmental Technologies, Inc, American Association of Radon Scientists and Technologists; Jane Malone, American Association of Radon Scientists and Technologists, American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, EPA (bowles.thomas@epa.gov); Jonathan Wilson, National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, American Lung Association (kevin.stewart@lung.org); Ruth McBurney, CRCPD, Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.3 Soil-gas-retarder. ~~A minimum 6-mil (0.15 mm) [or 3-mil (0.075 mm) cross-laminated] polyethylene~~ASTM E1745 Class A or equivalent flexible sheeting material shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly, and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped not less than 12 inches (305 mm). The sheeting shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting.

Reason: This change makes the Appendix consistent with the material requirements in the body of the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
An ASTM 1745 Class A vapor retarder is already required in R506.2.3.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
AF103.3 Soil-gas-retarder. ~~ASTM E1745 Class A or equivalent~~ flexible sheeting material complying with Section R506.2.3 shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly, and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped not less than 12 inches (305 mm). The sheeting shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting.

Committee Reason: The proposal for the appendix for Radon Control Methods was approved because the modification changed to proposal to be consistent with the membrane requirements currently in the IRC. By referencing R506.2.3, this will be consistent with the previous committee action on Section R506.2.3 and will keep the sections coordinated over time. (Vote: 9-0)

Final Hearing Results

RB293-22	AM

RB295-22

Original Proposal

IRC: AF103.2

Proponents: David Kapturowski, Spruce Environmental Technologies, Inc, American Association of Radon Scientists and Technologists; Jane Malone, American Association of Radon Scientists and Technologists, American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, EPA (bowles.thomas@epa.gov); Jonathan Wilson, National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, American Lung Association (kevin.stewart@lung.org); Ruth McBurney, CRCPD, Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

2021 International Residential Code

Revise as follows:

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a $^{1}/_{4}$-inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

   Exception: A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

Reason: Well drained soils do not require a sand layer and the matting can be laid right on the native soils, where applicable.

Cost Impact: The code change proposal will decrease the cost of construction
This will eliminate the requirement for a sand base layer where appropriate soils exist.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal for the appendix on Radon Control Methods allows for additional options for subfloor preparation, however the new exception should be applied to the entire section and not just option 2. (Vote: 10-0)

Public Comments

Public Comment 1

Proponents: David Kapturowski, Spruce Environmental Technologies, Inc, American Association of Radon Scientists and Technologists; Jonathan Wilson, National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, American Lung Association (kevin.stewart@lung.org); Ruth McBurney, CRCPD, Conference of Radiation Control Program Directors

(rmcburney@crcpd.org); Jane Malone, American Association of Radon Scientists and Technologists, American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

<u>**Exception:** A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1</u>

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a $^{1}/_{4}$-inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

   ~~**Exception:** A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1~~

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

Commenter's Reason: The Exception was relocated as the committee requested.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This will eliminate the requirement for a sand base layer where appropriate soils exist.

Final Hearing Results	
RB295-22	AMPC1

RB296-22

Original Proposal

IRC: SECTION AJ108.1

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Residential Code

SECTION AJ108
RENOVATIONS

Revise as follows:

AJ108.1 Materials and methods. The work shall comply with the materials and methods requirements of this code.<u>For the purpose of compliance with Chapter 11 of this code, a *renovation* shall be included within the scope of an a*lteration* as defined in Chapter 11</u>.

Reason: Chapter 11 does not address energy efficiency requirements separately for "renovations" as it considers them in a more broadly defined category of "alterations" (see Chapter 11 and Appendix AJ definitions below). For example, the definition of "alteration" in Chapter 11 is inclusive of renovation but the connection to a separate use of the defined term "renovation" in Appendix AJ is not obvious. This proposal provides a necessary clarification to avoid conflict between requirements in Chapter 11 of the IRC for existing building (particularly Section N1111) and in Appendix AJ in relation to work performed on existing buildings.
The following are definitions for Alternation and Renovation in Appendix AJ Section 106:

> ALTERATION. The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment.
>
> RENOVATION. The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are not considered refinishing for purposes of this definition, and are not renovation.

The following is the definition for Alteration in Chapter 11 of the IRC:

> ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

Renovation is not separately defined in Chapter 11 of the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal establishes the proper usage of terms and their alignment between Appendix AJ and IRC Chapter 11 so that the application of the existing requirements are better coordinated. The proposal does not change the existing technical requirements in Chapter 11 or in Appendix AJ so there is no change in cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal for the appendix for Existing Buildings is a necessary reminder that the Energy requirements do not have renovation requirements. (Vote: 10-0)

Final Hearing Results	
RB296-22	AS

RB297-22

Original Proposal

IRC: APPENDIX AJ, SECTION AJ101.1, AJ102.1, AJ102.2 (New), AJ104.1, AJ107.4 (New), AJ108.4, AJ109.4, AJ110.5 (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)

2021 International Residential Code

Revise as follows:

APPENDIX AJ EXISTING BUILDINGS~~ AND STRUCTURES~~

SECTION AJ101 PURPOSE AND INTENT

Revise as follows:

AJ101.1 General. The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings~~and structures~~. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code. <u>Structural elements and systems shall comply with Section R102.7.1 and Chapter 3 through Chapter 10 of the *International Residential Code*.</u>

SECTION AJ102 COMPLIANCE

Revise as follows:

AJ102.1 General. Regardless of the category of work being performed, the work shall not cause the <u>building</u> ~~structure~~ to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously *approved* alternative arrangements than it was before the work was undertaken.

Add new text as follows:

<u>**AJ102.2 Structural.** Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the International Residential Code. The work performed shall not cause the structure to become less compliant with the International Residential Code than it was before the work was undertaken.</u>

SECTION AJ104 EVALUATION OF AN EXISTING BUILDING

Revise as follows:

AJ104.1 General. The *building official* shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions <u>and Section R102.7.1 and structural provisions of the *International*</u>

Residential Code, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
   1.1. Field surveys.
   1.2. Tests (nondestructive and destructive).
   1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

SECTION AJ107 REPAIRS

Add new text as follows:

AJ107.4 Structural. Repaired structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*.

SECTION AJ108 RENOVATIONS

Revise as follows:

AJ108.4 Structural. Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*. Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

SECTION AJ109 ALTERATIONS

Revise as follows:

AJ109.4 Structural. Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*. ~~The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.~~

SECTION AJ110 RECONSTRUCTION

Add new text as follows:

AJ110.5 Structural. Reconstructed structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code* for new construction.

Reason: This proposal aligns the structural provisions of Appendix AJ with the main body of the IRC. Appendix AJ has not been updated to correlate with changes in the IRC and IEBC provisions that have occurred during recent code cycles. However, Section AJ101.1 states: *"Compliance with these provisions shall be deemed to meet the requirements of this code."* Given both the limitations of the structural requirements outlined in Appendix AJ and the disconnect between the appendix and main body of the codes (IRC and IEBC), allowing this Appendix to be considered "deemed to comply" is dangerous with regard to the structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction within the IRC, since the main body of the IRC is the default resource used given the present limitations of Appendix AJ.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
AJ101.1 General. The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code. Structural elements and systems shall comply with Section R102.7.1 and the provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the *International Residential Code*~~.

AJ102.2 Structural. Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the International Residential Code~~. The work performed shall not cause the structure to become less compliant with the International Residential Code than it was before the work was undertaken.
AJ102.4Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed. The minimum design loads for new structural components shall comply with the International Residential Code. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsafe shall be repaired in accordance with Section R102.7.1.

AJ104.1 General. The *building official* shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions and Section R102.7.1 and structural provisions of this Appendix, ~~the *International Residential Code*,~~ and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
   1.1. Field surveys.
   1.2. Tests (nondestructive and destructive).
   1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

AJ107.4 Structural. Repaired structural elements and systems shall comply with Section R102.7.1 and the structural provisions ofthis Appendix. ~~Chapter 3 through Chapter 10 of the *International Residential Code*.~~
AJ108.4 Structural. Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the *International Residential Code*.~~ Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a*reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

AJ109.4 Structural. Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions ofthis Appendix. ~~Chapter 3 through Chapter 10 of the *International Residential Code*.~~

AJ110.5 Structural. Reconstructed structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the *International Residential Code* for new construction~~.

Committee Reason: This proposal for the appendix for Existing Buildings is approved as modified. The modification provides an opportunity to use loads required at the time of construction on existing elements and new loads on new elements. The proposal is consistent with action previously taken and it fixes Section AJ108.4. The may need to be some correlation with Section AJ108.4 and previous actions. There were concern that removing the words "and structures" from the title removes some of the scoping from this provision. (Vote: 9-1)

Public Comments

Public Comment 1

Proponents: Julie Furr, Rimkus Consulting Group, Inc., FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov); 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 Residential Code

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES

SECTION AJ101
PURPOSE AND INTENT

AJ101.1 General. The purpose of these provisions is to encourage the continued use or reuse of legally existing buildingsand structures. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. ~~Compliance with these provisions shall be deemed to meet the requirements of this code.~~ Structural elements and systems shall comply with Section R102.7.1 and the provisions of this Appendix.

SECTION AJ102
COMPLIANCE

AJ102.1 General. Regardless of the category of work being performed, the work shall not cause the building or structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously *approved* alternative arrangements than it was before the work was undertaken.

AJ102.2 Structural. Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of this Appendix. The work performed shall not cause the structure to become less compliant with the International Residential Code than it was before the work was undertaken.

~~AJ102.4~~ AJ102.2.1 ~~Structural~~ Design loads. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed. The minimum design loads for new structural components shall comply with the International Residential Code. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsafe shall be repaired in accordance with R102.7.1.

AJ108.4 Structural. ~~Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of this Appendix.~~ Unreinforced masonry buildings located in Seismic Design Category D_2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an*approved* design.

~~**AJ109.4 Structural.** Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this Appendix.~~

Commenter's Reason: This public comment restores the references to "structure" that were removed from Appendix AJ with the original proposal and overlooked with the approved floor modifications.
AJ102.4 was added by the floor modification, however, the original intent was for this section to be a subset of AJ102.2. There should not be two sections with the same title.

AJ108.4 is deleted as a correlation with RB206-22 that was approved as modified and deals more unreinforced masonry parapets – with is currently the only structural item dealt with in this section on Renovations.

AJ109.4 is deleted as a correlation with RB162-22 that was approved as modified and deals more extensively with requirements for structural alterations to existing buildings.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

- https://www.cdpaccess.com/p/public-comment/3132/27763/files/download/3694/FEMA-IRC%20APP%20J%20compiled%2007-21-22%20%282%29.pdf
    - This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
Because the main body of the code is the default resource used given the present limitations of Appendix AJ, this proposal with floor modifications and public comments will not increase the cost of construction within the IRC. This is a long overdue cleanup that begins to align the Appendix provisions with the requirements of the main body of the code as they are frequently interpreted and used in the field.

Final Hearing Results

RB297-22	AMPC1

RB298-22

Original Proposal

IRC: AJ102.4.3, AJ102.4.3.1
Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Revise as follows:

AJ102.4.3 Replacement windows for emergency escape and rescue openings. Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is not part of a change of occupancy.
3. Window opening control devices complying with F409–2017 shall be permitted for use on windows required to provide emergency escape and rescue openings.

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

AJ102.4.3.1 Control devices. <u>Window opening control devices or fall prevention devices complying with ASTM F2090 shall be permitted for use on windows required to provide emergency escape and rescue openings.</u> ~~Emergency escape and rescue openings with window opening control devices or fall prevention devices complying with ASTM F2090,~~ <u>A</u>~~a~~fter operation to release the control device allowing the window to fully open, <u>the control device</u> shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.

Reason: This is a coordination item. The proposed text is what is found in IEBC Section 505.3.1 and 702.5.1 for control devices on existing windows that are used for emergency escape and rescue. The same phraseology/intent is in appendix J, but is written differently. This could be read as asking for something different, which is not the case. This also better coordinates with R310.5.

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 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 is a clarification/coordination of requirements. It has no technical changes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal to the appendix for Existing Buildings is a necessary clarification in correlation with the other ICC codes for replacement windows and control devices. Consistent requirements should lead to consistent enforcement. (Vote:10-0)

Final Hearing Results

RB298-22	AS

RB299-22

Original Proposal

IRC: AJ110.5 (New)
Proponents: Matthew Dobson, Vinyl Siding Institute, Vinyl Siding Institute (mdobson@vinylsiding.org)

2021 International Residential Code

Add new text as follows:

AJ110.5 Exterior Wall Coverings. *Exterior wall coverings* shall comply with the requirements of Chapter 7. Exterior wall coverings shall be attached to a n*ailable substrate.*

Reason: This is a simple addition to the existing building appendix, it is similar to how the IEBC handles wall coverings, as it points to the exterior wall covering chapter. In addition, a short provision is added on the importance of a nailable substrate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Just highlights an important component to re-siding installation.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
AJ110.5 Exterior Wall Coverings. *Exterior wall coverings* shall comply with the requirements of Chapter 7of this code. ~~Exterior wall coverings~~ Insulated Vinyl Siding, Polypropylene Siding, and Vinyl Siding shall be attached to a *nailable substrate* or other substrate suitable for mechanical fasteners.

Committee Reason: In this proposal for the appendix to Existing Building, the committee determined that reconstruction of the exterior siding should require compliance with Chapter 7. This is consistent with IEBC requirements for exterior wall coverings. The modification cites specific types for exterior wall covering and addresses substrates for mechanical fasteners. (Vote: 10-0).

Final Hearing Results

RB299-22	AM

RB302-22

Original Proposal

IRC: AR103.1.1 (New)

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 Residential Code

Add new text as follows:

AR103.1.1 Flood hazard areas. In flood hazard areas established in Table R301.2, light straw-clay infill shall comply with the flood damage-resistant materials requirements of Section R322.1.8.

Reason: Section R322 contains requirements for dwellings in flood hazard areas. Section R322.1.8 requires materials used for walls to be flood damage-resistant materials that conform to NFIP Technical Bulletin 2, Flood Damage-Resistant Materials Requirements. Light straw-clay materials that are inundated by floodwater, especially floodwater that remains high for more than a few hours, could deteriorate. Thus, referring to the flood-damage resistant materials requirement is not a new requirement. Similar “reminders” of the flood provisions appear in Appendix AE (manufactured housing used as dwellings) and Appendix AJ (existing buildings and structures).
We note that the current edition of TB 2 does not include light straw-claw materials. However, an ASTM testing standard is in development (expected to be available for the 2027 I-Codes). When the ASTM standard is cited in a future edition of the codes, that will allow for tested materials that are not specifically listed in TB 2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because dwellings in flood hazard areas must already comply with Section R322, a reminder of compliance with the flood-resistant materials requirements is not a change. By referring to the existing requirement, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
~~**AR103.1.1**~~ **AR101.2 Flood hazard areas.** In flood hazard areas established in Table R301.2, buildings using light straw-clay infill shall meet the requirements of Section R322. ~~comply with the flood damage-resistant materials requirements of Section R322.1.8~~.

Committee Reason: This proposal for the appendix for Light Straw-Clay Construction was approved because requirements for flood hazard issues should be applied equally to all products of the built environment. The modification provides better language and is inclusive of all of Section R322. (Vote: 10-0)

Final Hearing Results

RB302-22	AM

RB304-22

Original Proposal

IRC: AS101.3 (New)

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 Residential Code

Add new text as follows:

AS101.3 Flood hazard areas. In flood hazard areas established in Table R301.2, buildings using strawbale wall systems shall meet the requirements of Section R322.

Reason: Section R322 contains requirements for dwellings in flood hazard areas. Thus, referring to Section R322 is not a new requirement. Similar “reminders” of the flood provisions appear in Appendix AE (manufactured housing used as dwellings) and Appendix AJ (existing buildings and structures).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because dwellings in flood hazard areas must already comply with Section R322, a reminder of compliance with the flood-resistant requirements is not a change. By referring to the existing requirements, there will be no cost impact when approving this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal for the Appendix for Strawbale Construction was approved because requirements for the flood hazard areas should apply equally to all products of the built environment. (Vote: 10-0)

Final Hearing Results

RB304-22	AS

RB306-22

Original Proposal

IRC: SECTION AS102.1, AS104.4.2, AS104.4.6.1, AS104.4.6.3, AS105.3.1, AS105.4.1, TABLE AS105.4, AS105.6.1, AS105.6.2, AS105.6.3

Proponents: Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com); Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, Arkin Tilt Architects, California Straw Building Association (david@arkintilt.com)

2021 International Residential Code

Revise as follows:

FINISH. Completed combination of materials on the interior or exterior face~~s~~ of a strawbale wall. ~~stacked *bales*.~~

ON-EDGE. The orientation of a *bale* with its largest faces vertical, its longest dimension horizontal and parallel with the wall plane, its *ties* on the face of the wall and its *straw* lengths oriented predominantly vertically. See Figure AS102.1.

SHEAR WALL. A *strawbale* wall designed and constructed to resist in-plane lateral seismic and wind forces in accordance with Section AS106.13. ~~This term is synonymous~~ Synonymous with “ Braced wall panel. ”

SKIN. ~~The compilation of *plaster*~~ *Plaster* and its reinforcing, if any, applied to the ~~sur~~face of a strawbale wall. ~~stacked *bales*.~~

AS104.4.2 Lath and mesh for plaster. The surface of the *straw bales* functions as lath, and other lath or *mesh* shall not be required, except as required for out-of-plane load resistance by Table AS105.4 or for structural walls by Tables AS106.12 and AS106.13(1).

AS104.4.6.1 General. Lime *plaster* is any *plaster* with a binder that is composed of calcium hydroxide ~~(CaOH)~~ ($Ca(OH)_2$) including Type N or S hydrated lime, hydraulic lime, natural hydraulic lime or slaked quicklime. Hydrated lime shall comply with ASTM C206. Hydraulic lime shall comply with ASTM C1707. Natural hydraulic lime shall comply with ASTM C141 and CEN EN 459. Quicklime shall comply with ASTM C5.

AS104.4.6.3 On structural walls. Lime *plaster* on *strawbale* structural walls in accordance with Table AS106.12 or AS106.13(1) shall use hydraulic or natural hydraulic lime.

> **Exception:** A non-hydraulic lime plaster demonstrating the minimum compressive strength in accordance with Section AS106.6.1 and Table AS106.6.1.

AS105.3.1 Exterior sill plate flashing. Exterior sill plates shall receive flashing across the joint between the sill plate ~~to~~ and the slab or foundation ~~joints~~.

AS105.4.1 Determination of out-of-plane loading. Out-of-plane loading for the use of Table AS105.4 shall be in terms of the ultimate design wind speed and seismic design category ~~as~~ determined in accordance with Sections R301.2.1 and R301.2.2 respectively. An *approved* engineered design for out-of-plane load resistance in accordance with Section R301.2.1 shall be required ~~where~~ when the building is located in a special wind region or where wind design is required in accordance with Figure R301.2(2) and Section R301.2.1.1, ~~respectively~~.

TABLE AS105.4 OUT-OF-PLANE LOAD RESISTANCE METHODS AND UNRESTRAINED WALL DIMENSION LIMITS

METHOD OF OUT-OF-PLANE LOAD RESISTANCE[a]	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED WALL DIMENSIONS, *H*[b]		MESH STAPLE SPACINGAT BOUNDARY RESTRAINTS
			Absolute limit in feet	Limit based on bale thickness *T*[c] in feet (mm)	
Nonplaster finish or unreinforced plaster	≤ 130	A, B, C, D_0	$H \le 8$	$H \le 5T$	None required
Pins per Section AS105.4.2	≤ 130	A, B, C, D_0	$H \le 12$	$H \le 8T$	None required
Pins per Section AS105.4.2	≤ 140	A, B, C, D_0, D_1, D_2	$H \le 10$	$H \le 7T$	None required

METHOD OF OUT-OF-PLANE LOAD RESISTANCE	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED WALL DIMENSIONS, *H* Absolute limit in feet	UNRESTRAINED WALL DIMENSIONS, *H* Limit based on bale thickness *T* in feet (mm)	MESH STAPLE SPACINGAT BOUNDARY RESTRAINTS
Reinforced[d] clay plaster	≤ 140	A, B, C, D_0, D_1, D_2	$H \le 10$	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 6 inches
Reinforced[d] clay plaster	≤ 140	A, B, C, D_0, D_1, D_2	$10 < H \le 12$	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 4 inches[e]
Reinforced[d] cement, cement-lime, lime or soil-cement plaster	≤ 140	A, B, C, D_0, D_1, D_2	$H \le 10$	$H \le 9T^{0.5}$ ($H \le 157T^{0.5}$)	≤ 6 inches
Reinforced[d] cement, cement-lime, lime or soil-cement plaster	≤ 155	A, B, C, D_0, D_1, D_2	$H \le 12$	$H \le 9T^{0.5}$ ($H \le 157T^{0.5}$)	≤ 4 inches[e]
2×6 load-bearing wood studs[f] at max. 6′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H[g] ≤ 9	NA	None required
2×6 load-bearing wood studs[f] at max. 4′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H[g] ≤ 10	NA	None required
2×6 load-bearing wood studs[f] at max. 2′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H[g] ≤ 12	NA	None required
2×4 load-bearing wood studs[f] at max. 2′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H[g] ≤ 10	NA	None required
2×6 nonload-bearing wood studs[f] at max. 6′ o.c.	≤ 140	A, B, C, D_0, D_1, D_2	H[g] ≤ 12	NA	None required

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

NA = Not Applicable.

a. Finishes applied to both sides of stacked bales. Where different finishes are used on opposite sides of a wall, the more restrictive requirements shall apply.

b. *H* = Stacked bale height in feet (mm) between sill plate and top plate or other approved horizontal restraint, or the horizontal distance in feet (mm) between approved vertical restraints. For load-bearing walls, *H* refers to vertical height only.

c. *T* = Bale thickness in feet (mm).

d. Plaster reinforcement shall be any mesh allowed in Table AS106.13(1) for the matching plaster type, and with staple spacing in accordance with this table. Mesh shall be installed in accordance with Section AS106.9.

e. Sill plate attachment shall be with $^5/_8$-inch anchor bolts or approved equivalent at not more than 48 inches on center where staple spacing is required to be ≤ 4 inches.

f. Bales shall be attached to the studs by an approved method. Horizontal framing and attachment at top and bottom of studs shall be in accordance with Section R602 or an approved alternative. Table R602.7(1) shall be used to determine the top framing member where load-bearing stud spacing exceeds 24 inches o.c.

g. *H* is vertical height only.

AS105.6.1 ~~Water-resistant~~ Water-resistive barriers and vapor permeance ratings. *Plastered bale* walls shall be constructed without any membrane barrier between *straw* and *plaster* to facilitate transpiration of moisture from the *bales*, and to secure a structural bond between *straw* and *plaster*, except as permitted or required elsewhere in this appendix. Where a ~~water-resistant~~ water-resistive barrier is placed behind an exterior finish, it shall have a vapor permeance rating of not less than 5 perms, except as permitted or required elsewhere in this appendix.

AS105.6.2 ~~Vapor~~ Interior vapor retarders. Wall *finishes* shall have an equivalent vapor permeance rating of a Class III vapor retarder on the interior side of exterior *strawbale walls* in Climate Zones 5, 6, 7, 8 and Marine 4, as defined in Chapter 11. *Bale* ~~*Balesin*~~ walls enclosing showers or steam rooms shall be protected on the interior side by a Class I or Class II vapor retarder.

AS105.6.3 Penetrations in exterior strawbale walls. Penetrations in exterior *strawbale* walls shall be sealed with an *approved* sealant or gasket on the exterior side of the wall in all climate zones. ~~, and~~ Penetrations, and joints at the floor and ceiling shall be sealed on the interior side of the wall in Climate Zones 5, 6, 7, 8 and Marine 4, as defined in Chapter 11.

Reason: This proposal does the following:

1. Removes ambiguous language, and modifies language in some sections for clarity and consistency with other IRC appendices.
2. Adds needed detail for requirements for plaster on strawbale structural walls.
3. Clarifies requirements for determination of out-of-plane loading.

4. Corrects a terminology error replacing “water-resistant” with “water-resistive.”
5. Improves the section title for AS105.6.2 from “Vapor” to “Interior vapor retarders,” and improves language in the section.
6. Adds requirement for sealing penetrations and joints at the floor and ceiling for exterior walls.
7. Adds an alternative method for satisfying compressive strength requirement for natural hydraulic lime plasters.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The removal of ambiguous language, the modification of language for consistency with other IRC appendices, and clarification of requirements do not affect construction costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal to the appendix for Strawbale Construction was approved because it improves the language, clarifies the requirements and expands options for this type of construction. (Vote: 9-0)

Final Hearing Results

RB306-22	AS

RB307-22

Original Proposal

IRC: AS106.6.1

Proponents: Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, DCAT (strawnet@gmail.com); David Arkin, AIA, Arkin Tilt Architects, California Straw Building Association (david@arkintilt.com)

2021 International Residential Code

Revise as follows:

AS106.6.1 Compressive strength. For plaster on *strawbale* structural walls, the *building official* is authorized to require a 2-inch (51mm) cube test conforming to ASTM C109 to demonstrate a minimum compressive strength in accordance with Table AS106.6.1. For natural hydraulic lime (NHL) plasters, the compressive strength in the NHL manufacturer's specifications is permitted to be used to satisfy the requirements in Table AS106.6.1, when the plaster mix used for the project is identical to that in the manufacturer's specifications.

Reason: The time for lime plasters to develop 90% or more of their compressive strength is considerably longer (6 months or more) than those containing Portland cement, or those using a clay binder. This can create significant delays in construction if a sample demonstrating compressive strength of lime plaster is required. Natural hydraulic limes have proven highly reliable in producing plasters with compressive strengths that meet the values in the manufacturer's specifications. Therefore those specifications can be used to satisfy the compressive strength required in Table AS106.1.1, in lieu of a compressive strength test. The plaster used in the project must be identical to the manufacturer's specifications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Allowing a manufacturer's specification to be used to demonstrate an NHL plaster's compressive strength will not affect construction costs. Any tendency would be to reduce construction cost, because of time saved, as well as cost of testing no longer required.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal for the appendix for Strawbale Construction was approved because this allows a manufacturer specification for compressive strength of a natural hydraulic lime to be used to satisfy the requirements in Table AS106.6.1. (Vote: 9-0)

Final Hearing Results

RB307-22 AS

RB308-22

Original Proposal

IRC: AU105.3.4.2, AU106.6.1, AU106.8

Proponents: Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com); Kevin Donahue, Verdant Structural Engineers, Verdant Structural Engineers (kevin@verdantstructural.com)

2021 International Residential Code

Revise as follows:

AU105.3.4.2 Horizontal reinforcing. Two-inch by 2-inch (51 mm by 51 mm) 14-gage galvanized steel mesh shall be embedded 4 inches (102 mm) in the *cob* ~~above the rough opening and~~ below the rough opening for windows, and shall extend 12 inches (305 mm) beyond the sides of the opening. Walls below rough window openings greater than 4 feet 6 inches (1372 mm) in height shall be provided with additional horizontal reinforcing at midheight.

AU106.6.1 Demonstration of compressive strength. The compressive strength of the *cob* mix to be used in structural walls and *nonstructural walls* as required in Section AU106.6 shall be demonstrated to the building official before the placement of *cob* onto walls, with compressive strength tests and an associated report by an *approved* laboratory or with an *approved* on-site test as follows:

1. Five samples of the proposed cob mix shall be placed moist to completely fill a 4-inch by 4-inch by ~~4-inch~~ 8-inch (102 mm by 102 mm by ~~102~~ 203 mm) form and dried to ambient moisture conditions.
2. Samples shall not be oven dried.
3. ~~Any opposite~~ The 4-inch by 4-inch (102 mm by 102 mm) faces shall be ~~faced~~ capped with plaster of paris ~~if needed~~ to achieve smooth, parallel faces, after which the sample shall reach ambient moisture conditions before testing.
4. Samples shall be constructed, dried, and tested with the long dimension vertical.
5. ~~4.~~ The horizontal cross section of the dried sample as tested, and the maximum applied load at failure shall be used to calculate the sample's compressive strength.
6. ~~5.~~ The fourth-lowest value shall be used to determine the mix's compressive strength.

AU106.8 Bearing capacity. The allowable bearing capacity for *cob load-bearing walls* supporting vertical roof and/or ceiling loads imposed in accordance with Section R301 shall not exceed 2200 plf and shall be determined by Equation AU-2. Use of bearing capacities determined with Equation AU-2 exceeding 2200 plf requires an *approved* design prepared by a *registered design professional* that accounts for buckling.

$$\cancel{144}\ (C \times T_{min}\ \underline{\times 12})/3 - (H \times T_{avg}\underline{/12} \times D) \qquad \textbf{(Equation AU-2)}$$

BC = Allowable bearing capacity of wall (in pounds per lineal foot of wall).

C = Compressive strength (in psi) as determined in accordance with Section AU106.6.

T_{min} = Thickness of wall (in ~~feet~~ inches) at its minimum.

H = Height of *cob* portion of wall (in feet).

T_{avg} = Average thickness of wall (in ~~feet~~ inches).

D = Density of *cob* = 110 (in pounds per cubic foot), unless a lesser value at equilibrium moisture content is demonstrated.

Reason: The proposed code changes in this proposal create new or revised requirements relative to the appendix as first approved for the 2021 IRC. These changes are based on further experience, laboratory testing, and additional information from prominent cob design and construction professionals. Reasons for proposed changes in this section are as follows:

1. Adjusted required compression test size as a result of University of California, Berkeley and University of San Francisco testing.

2. Limitations of allowable bearing loads of cob walls based on buckling considerations.

Cost Impact: The code change proposal will increase the cost of construction
The increase sample size for compression testing could increase cost of testing slightly. The limitation on loading due to buckling effects will not affect cost compared to systems that already exist in this code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal to the appendix for Cob Construction was approved because it adjusts required compression test size of the mix and limits allowable bearing loads of cob walls based on new and revised requirements relative to the appendix based on further experience, laboratory testing, and additional information. (Vote: 9-0)

Final Hearing Results

RB308-22	AS

RB309-22

Original Proposal

IRC: SECTION AU102 (NEW), SECTION AU102, AU103.8, AU104.1.2, AU104.4, AU104.4.1, AU105.2, TABLE AU105.3, AU105.4.1, AU105.4.2, AU105.4.5, FIGURE AU105.4.5 (New), AU106.1, AU106.6, AU106.8.2, AU109.2

Proponents: Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com)

2021 International Residential Code

Add new definition as follows:

BUCK. A frame, typically wood, anchored in a wall system, that creates the rough opening into which a window or door frame is installed.

Revise as follows:

COB. A composite building material consisting of refined *clay* or *clay subsoil* wet-mixed with loose straw and sometimes sand. ~~Also known as “Monolithic adobe.”~~

COB CONSTRUCTION. A wall system of layers or lifts of moist cob placed to create monolithic walls, typically without formwork. Also known as "Monolithic Adobe."

UNSTABILIZED. ~~A cob~~ *Cob* or other earthen material that does not contain admixtures such as Portland cement, lime, asphalt emulsion or oil.

AU103.8 Drying holes. Where holes to facilitate drying are used, such holes shall be permitted to be of any depth and shall not exceed ~~exceeding~~ $^3/_4$ inch (19 mm) in diameter ~~on the face of *cob* walls~~. Drying holes shall not be spaced closer than 10 hole-diameters, and~~.~~ ~~Drying holes~~ shall not be placed in *braced wall panels*. The design load on *load-bearing walls* with drying holes shall not exceed 90 percent of the allowable bearing capacity as determined in accordance with Section AU106.8. Drying holes shall be filled with *cob* before final inspection.

AU104.1.2 Exterior wall finishes. Where installed, exterior wall *finishes* shall be *plasters* in accordance with Section AU104.4, nonplaster exterior wall coverings in accordance with Section R703, or other *finish* systems in accordance with the following:

1. Specifications and details of the *finish* system’s ~~means of~~ attachment to the wall or its independent support, and of its means of draining or evaporating water that penetrates the exterior *finish*, shall be ~~provided~~ *approved*.
2. The vapor permeance of the combination of *finish* materials shall be 5 perms or greater to allow the transpiration of water vapor from the wall.
3. *Finish* systems with weights greater than 10 pounds per square foot (48.9 kg/m) and less than or equal to 20 pounds per square foot (97.8 kg/m) of wall area shall require that the minimum total length of *cob* *braced wall panels* in Table AU106.11(3) be multiplied by a factor of 1.2.
4. *Finish* systems with weights greater than 20 pounds per square foot (97.8 kg/m) of wall area shall require an engineered design.

AU104.4 Plaster. *Plaster* applied to *cob* walls shall be any type described in this section. *Plaster* thickness shall not exceed 3 inches (76 mm) on each face except ~~where~~ with an *approved* engineered design ~~is provided~~.

AU104.4.1 Plaster and membranes. *Plaster* shall be applied directly to *cob* walls to facilitate transpiration of moisture from the walls and to secure a mechanical bond between the *plaster* and the *cob*, and shall comply with Section AU105.4.1. ~~A membrane shall not be located between the *cob* wall and the *plaster*.~~

AU105.2 Building limitations and requirements for cob wall construction. *Cob* walls shall be subject to the following limitations and requirements:

1. Number of stories: not more than one.
2. Building height: not more than 20 feet (6096 mm).
3. *Seismic design categories*: limited to use in *Seismic Design Categories* A, B and C, except ~~where~~ with an *approved* engineered design ~~is provided~~.
4. Wall height: in accordance with Table AU105.3, and with Table AU106.11(1) for *braced wall panels*.
5. Wall thickness, excluding *finish*, shall be not less than 10 inches (254 mm), not greater than 24 inches (610 mm) at the top two-thirds, not limited at the bottom third and, for structural walls, shall comply with Section AU106.2, Item 2. Wall taper is permitted in accordance with Section AU106.5, Item 1.
6. Interior *cob* walls shall require an *approved* engineered design that accounts for the seismic load of the interior *cob* walls, except in Seismic Design Category A for walls with a height to thickness ratio less than or equal to to 6.

TABLE AU105.3 OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS

WALL TYPE[a, g, h] AND METHOD OF OUT-OF-PLANE LOAD RESISTANCE	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED COB WALL HEIGHT H[b, c]		TOP ANCHOR[e] SPACING (inches)	TENSION TIE[f] SPACING (inches)
			Absolute Limit (feet)	Limit Based on Wall Thickness T[d] (feet)		
Wall 1[i]: no anchors, no steel wall reinforcing	≤ 110	A	$H \le 8$	$H \le 6T$	None	48
Wall 2: top anchors,[j] continuous vertical 6″ × 6″ × 6″ gage steel mesh in center of wall embedded in foundation 12 inches	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall A[i]: top anchors, no vertical steel reinforcing	≤ 120	A, B	$H \le 8$	$H \le 6T$	12	48
Wall B[i]: top and bottom anchors, no vertical steel reinforcing	≤ 130	A, B	$H \le 8$	$H \le 6T$	12	48
Wall C: top and bottom anchors, continuous vertical threaded rod at 4 feet on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24
Wall D: continuous vertical threaded rod at 1 foot on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	N/A	24
Wall E: top anchors, continuous vertical 6″ × 6″ × 6″ gage steel mesh 2 inches from each face of wall embedded in foundation	≤ 140	A, B, C	$H \le 8$	$H \le 8T$	12	24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
N/A = Not Applicable

a. See Table AU106.11(1) for reinforcing and anchorage specifications for wall Types A, B, C, D and E.

b. H = height of the cob portion of the wall only. See Figure AU101.4. The maximum H is the absolute limit or the limit based on wall thickness, whichever is more restrictive.

c. Bond beams or other horizontal restraints are ~~capable of separating~~ permitted to divide a wall into more than one unrestrained wall height with an *approved* engineered design.

d. T = Cob wall thickness (in feet) at its minimum, without plaster.

e. $^5/_8$-inch threaded rod anchors at prescribed spacing with 12-inch embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.

f. Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure AU106.9.5. Where rafters are attached to tension ties, roof sheathing shall be edge nailed.

g. All walls shall be tested for compressive strength in accordance with Section AU106.6.

h. For curved walls with an arc length (ARC$_c$) to radius(R$_c$) ratio of 1.5:1 or greater, the *H*/*T* factor shall be increased by 1, and the absolute height limit by 1 foot. See Section AU106.11.3.

i. Wall type requires a modulus of rupture test in accordance with Section AU106.7.

j. See wall Type A in Table AU106.11(1) for top anchor requirements.

AU105.4.1 ~~Water-resistant~~ Water-resistive barriers and vapor permeance. *Cob* walls shall be constructed without a membrane barrier ~~between the *cob* wall and *plaster* to facilitate transpiration of water vapor from the wall, and to secure a mechanical bond between the *cob* and *plaster*,~~ except as otherwise required elsewhere in this appendix. Where a ~~water-resistant~~ water-resistive barrier is placed behind an exterior *finish*, it shall be considered part of the *finish* system and shall comply with Item 2 of Section AU104.1.2 for the combined vapor permeance rating.

AU105.4.2 Horizontal surfaces. *Cob* walls and other *cob* elements shall be provided with a ~~water-resistant~~water-resistive barrier at weather-exposed horizontal surfaces. The ~~water-resistant~~water-resistive barrier shall be of a material and installation that will prevent erosion and prevent water from entering the wall system. Horizontal surfaces, including exterior window sills, sills at exterior niches and exterior buttresses, shall be sloped not less than 1 unit vertical in 12 units horizontal to drain away from *cob* walls or other *cob* elements.

AU105.4.5 Installation of windows and doors. Windows and doors shall be installed in accordance with the manufacturer's instructions to a wood~~en frame~~*buck* of not less than nominal 2-inch by 4-inch (51 mm by 102 mm) wood members. The installation of windows and doors and their bucks shall prevent the passage of air and water into or through the wall system. ~~anchored into the *cob* wall with 16d galvanized nails half-driven at a maximum 6-inch (152 mm) spacing, with the protruding half embedded in the *cob*. The wood frame shall be embedded not less than 1½ inches (38 mm) in the *cob* and shall be set in from each face of the wall not less than 3 inches (76 mm). Alternative window and door installation methods shall be capable of resisting the wind loads in Table R301.2.1(1). Windows and doors in *cob* walls shall be installed so as to mitigate the passage of air or moisture into or through the wall system.~~ Window sills shall comply with Section AU105.4.2. Window and door bucks shall be installed in accordance with Figure AU105.4.5 and one of the following methods:

1. Side members of the *bucks* shall be anchored into the cob wall by embedding the protruding half of half-driven 16d galvanized nails at a maximum 6-inch (152mm) spacing. The buck shall be embedded into the cob not less than 1½ inches (38mm) and set in from each face of the wall not less than 3 inches (76mm).
2. Wood stiffeners not less than nominal 2-inch by 4-inch (51mm by 102mm) shall be attached on-edge to the sides of the *buck* and embedded in the cob wall a minimum of 3½ inches (89mm). Stiffeners shall anchor into the cob wall with the protruding end of half-driven 16d galvanized nails at a maximum 6-inch (152mm) spacing. Stiffeners shall be set back not less than 3 inches (76mm) from each wall face. Bucks are permitted to be exposed and do not require anchoring nails when stiffeners are used with this method.
3. Other *approved* methods satisfying the performance requirements of Section AU105.4.5.

Exception: Windows and unframed glass shall be permitted to be embedded directly into a cob wall with an *approved* design.

Add new text as follows:

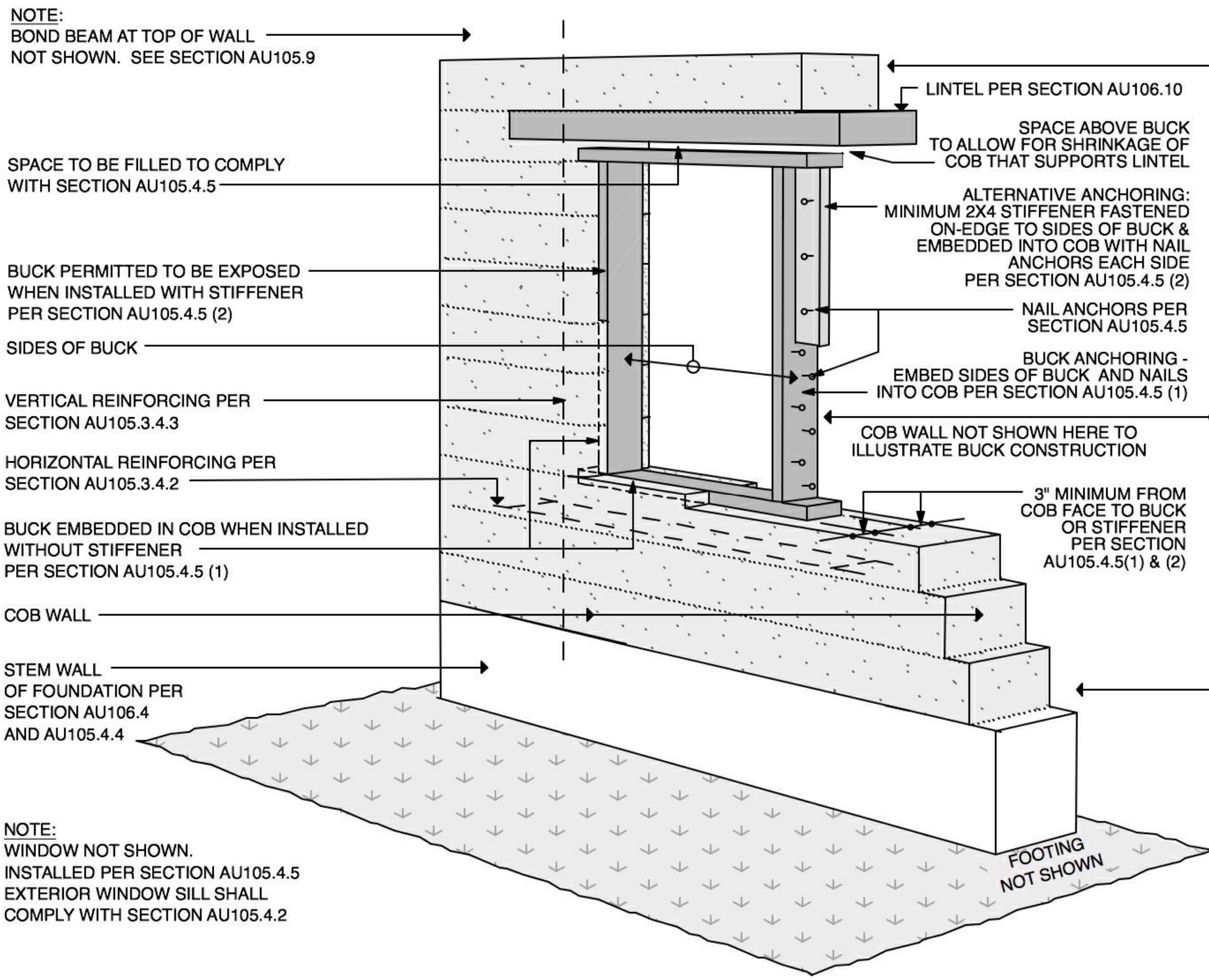

FIGURE AU105.4.5 WINDOW INSTALLATION (DOOR INSTALLATION SIMILAR)

Revise as follows:

AU106.1 General. *Cob* structural walls shall be in accordance with the prescriptive provisions of this section. Designs or portions of designs not complying with this section shall require an *approved* design by a *registered design professional* except where an engineered design is required.

AU106.6 Compressive strength of cob structural and nonstructural walls. All *cob* walls shall have a minimum compressive strength of 60 psi (414 kPa)~~. Cob~~, and *cob* in walls used as *braced wall panels* shall have a minimum compressive strength of 85 psi (586 kPa) except with an approved engineered design.

AU106.8.2 Support of concentrated loads. Concentrated roof and ceiling loads shall be distributed by structural elements capable of distributing the loads to the *cob load-bearing wall* and within its allowable bearing capacity as determined in accordance with Section AU106.8. Concentrated loads over lintels or over bond beams spanning openings shall require an *approved* ~~engineered~~ design by a *registered design professional*.

AU109.2 Thermal resistance. The unit *R*-value for *cob* walls with a density of 110 pounds per cubic foot (1762 kg/m^3) shall be R-0.22 (RSI 0.0387) per inch of *cob* thickness. The unit *R*-value for cob walls with a density of 75 pounds per cubic foot (1762kg/m^3) shall be R-0.54 (RSI 0.095) per inch of cob thickness. Linear interpolation is permitted. Extrapolation is not permitted. Walls that vary in thickness along their height or length shall use the average thickness of the wall to determine its *R*-value. The thermal resistance values of air films and finish materials or additional insulation shall be added to the cob wall's thermal resistance value to determine the *R*-value of the wall assembly.Cob density shall be measured at equilibrium moisture content.

Reason: This proposal does the following:

1. Removes ambiguous language, improves wording, and corrects errors.
2. Several existing definitions are modified for clarity, accuracy and consistency with other appendices.
3. Adds a definition for the term “buck” which, though used in Section R609.7.2.1, is currently not a defined term. This is the proper term associated with the predominant method of installing windows and doors in cob walls, and is used in conventional masonry construction in the IRC.
4. Moves a Commentary Figure related to window and door installation into the Appendix. This greatly assists the understanding of window and door installations in cob walls.
5. Provides historically successful options for anchoring and embedding window and door bucks, and installing windows without bucks.
6. Clarifies when an approved or engineered design is required.
7. Adds a unit R-value for cob laboratory tested at a density of 75 pcf. Linear interpolation is permitted between this density point and the 110 pcf point currently in Appendix U (based on previous testing). Linear interpolation is consistent with established R-values of the analogous material of straw-clay at densities 50 pcf and below. The R-value in the proposal for the newly tested 75 pcf is the lowest of three samples, therefore conservative, and fits on the line between 110 pcf and the 50 pcf and lower straw-clay values. Extrapolation is not permitted. Testing reports can be found at https://www.cobcode.org/cobcode-documents.
8. Removes redundancies in requirements for finishes and moisture control.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal's corrections, improved clarity and consistency, additional design options for windows and a new Figure to illustrate window installation, do not affect costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal to the appendix for Cob Construction was approved because by removing ambiguous language and redundancies, correcting errors, modifying definitions and providing options, this clarifies design requirements. The proposal also adds a unit R-value. (Vote: 9-0)

Final Hearing Results

RB309-22	AS

RB310-22

Original Proposal

IRC: AU108.1, TABLE AU108.1 (New), TABLE AU105.3

Proponents: Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com); Kevin Donahue, Verdant Structural Engineers, Verdant Structural Engineers (kevin@verdantstructural.com); David Rich, Reax Engineering Inc., Reax Engineering Inc. (rich@reaxengineering.com); Nicholas Bartlett, National Renewable Energy Laboratory, Self (bartster84@gmail.com)

2021 International Residential Code

Revise as follows:

AU108.1 Fire-resistance rating. ~~*Cob* walls are not fire-resistance rated.~~ Cob walls that comply with Table AU108.1 shall be considered to provide a two-hour fire-resistance rating.

Add new text as follows:

TABLE AU108.1 TWO-HOUR FIRE-RESISTANCE RATED COB WALLS

Allowable superimposed load (plf)	Density[a] (pcf)	Minimum compressive strength per Section AU106.6.1 (psi)	Wall type reinforcementper Table AU105.3	Minimum thickness[c] at top of wall (inches)	Minimum thickness[c] at bottom of wall (inches)
1,200	100	85	E	9	12
475	50 pcf for the top 40 inches of wall height, maximum	40[b]	E or F	8	12
	70 pcf for the top 80 inches of wall height, maximum	55[b]			
non load-bearing	50 to 100[d]	>60 psi <60 psi[b]	E or F	9	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.45 kg

a. Density is to be measured at equilibrium moisture content. Average wall density shall be within +/- 5 pcf of the tabulated value.

b. Requires an *approved* engineered design per Section AU106.6.

c. Cob thickness only. The interior and exterior cob faces shall be permitted to be unfinished or receive any plaster finish allowed by this appendix.

d. Cob walls with more than one density shall be built with heavier densities below lighter densities.

Revise as follows:

TABLE AU105.3 OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS

WALL TYPE[a, g, h] AND METHOD OF OUT-OF-PLANE LOAD RESISTANCE	FOR ULTIMATE DESIGN WIND SPEEDS (mph)	FOR SEISMIC DESIGN CATEGORIES	UNRESTRAINED COB WALL HEIGHT H[b, c]		TOP ANCHOR[e] SPACING (inches)	TENSION TIE[f] SPACING (inches)
			Absolute Limit (feet)	Limit Based on Wall Thickness T[d] (feet)		
Wall 1[i]: no anchors, no steel wall reinforcing	≤ 110	A	$H \le 8$	$H \le 6T$	None	48

Wall 2: top anchors,[j] continuous vertical 6″ × 6″ × 6″ 6-inch x 6-inch 6-gage steel mesh in center of wall embedded in foundation 12 inches	≤ 140	A, B, C	*H* ≤ 8	*H* ≤ 8*T*	12	24
Wall A[i]: top anchors, no vertical steel reinforcing	≤ 120	A, B	*H* ≤ 8	*H* ≤ 6*T*	12	48
Wall B[i]: top and bottom anchors, no vertical steel reinforcing	≤ 130	A, B	*H* ≤ 8	*H* ≤ 6*T*	12	48
Wall C: top and bottom anchors, continuous vertical threaded rod at 4 feet on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	*H* ≤ 8	*H* ≤ 8*T*	12	24
Wall D: continuous vertical threaded rod at 1 foot on center embedded in foundation and connected to bond beam	≤ 140	A, B, C	*H* ≤ 8	*H* ≤ 8*T*	N/A	24
Wall E: top anchors, continuous vertical 6″ × 6″ × 6″ 6-inch x 6-inch 6-gage steel mesh 2 inches from each face of wall embedded in foundation	≤ 140	A, B, C	*H* ≤ 8	*H* ≤ 8*T*	12	24
Wall F: top anchors, continuous vertical 6-inch × 6-inch 10-gage steel mesh 2 inches from each face of wall embedded in foundation	≤ 140	A, B, C	*H* ≤ 8	*H* ≤ 8*T*	12	24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
N/A = Not Applicable

a. See Table AU106.11(1) for reinforcing and anchorage specifications for wall Types A, B, C, D and E.

b. *H* = height of the cob portion of the wall only. See Figure AU101.4. The maximum*H* is the absolute limit or the limit based on wall thickness, whichever is more restrictive.

c. Bond beams or other horizontal restraints are capable of separating a wall into more than one unrestrained wall height with an approved engineered design.

d. *T* = Cob wall thickness (in feet) at its minimum, without plaster.

e. $^5/_8$-inch threaded rod anchors at prescribed spacing with 12-inch embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.

f. Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure AU106.9.5. Where rafters are attached to tension ties, roof sheathing shall be edge nailed.

g. All walls shall be tested for compressive strength in accordance with Section AU106.6.

h. For curved walls with an arc length to radius ratio of 1.5:1 or greater, the*H*/*T* factor shall be increased by 1, and the absolute height limit by 1 foot.

i. Wall type requires a modulus of rupture test in accordance with Section AU106.7.

j. See wall Type A in Table AU106.11(1) for top anchor requirements.

Reason: A fire-resistance-rated cob wall assembly is added based on ASTM E119 test reports and an accompanying letter from the NTA/ICC testing engineers as well as Reax Engineering, which can be found at: https://www.cobcode.org/cobcode-documents. All Elements of Row 1 and 2, except for column 1 row 1 are references to the exact assembly tested in the ASTM E119 test with a field-common, 5% margin allowance for density. The requirement of column 1, row 1 is based on the ASTM E119 test and accompanying Engineering Judgment letters from NTA/ICC engineers and Reax Engineering. The requirement in footnote c is based on the unplastered assembly that was tested in the ASTM E119 test with the conservative allowance of the optional addition of plaster. The final row on the chart is based on conservatively removing the allowable superimposed load for the range of densities (50-100 pcf) tested in the ASTM E119 test. The reinforcing matches the ASTM E119 tests and the minimum thickness matches the minimum thickness of the ASTM E119 test for the highest density present (100pcf). An additional wall assembly was added to Table AU105.3 to allow for the exact gauge of reinforcing steel used in one of the ASTM E119 tests. Concerning out-of-plane loading, this system is stronger than the one tested and governing Table AU105.3, therefore this addition is conservative.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change simply offers options for tested fire-resistance-rated cob walls, which are no more costly than other non-rated cob walls.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal for the appendix for Cob Construction was disapproved because there was concern that only two systems were tested, and it seems like the codes require every potential variable for other wall assemblies and other materials in the codes. Some felt this proposal does clarify the direction to achieve a fire resistance rating. (Vote: 6-3)

Public Comments

Public Comment 1

Proponents: Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, DCAT (strawnet@gmail.com); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Rich, Reax Engineering Inc., Reax Engineering Inc. (rich@reaxengineering.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

AU108.1 Fire-resistance rating. Cob walls that comply with Table AU108.1 ~~shall be considered to provide~~ have a two-hour fire-resistance rating.

TABLE AU108.1 TWO-HOUR FIRE-RESISTANCE RATED COB WALLS

Allowable superimposed load (plf)	Density[a, d] (pcf)	Minimum compressive strength per Section AU106.6.1 (psi)	Wall type reinforcement per Table AU105.3	Minimum thickness[c, e,f] at top of wall (inches)	Minimum thickness[c, e, f] at bottom of wall (inches)
1,200	100	85	E	9	12
475	≥ 50 pcf: top of wall to for the top 40 inches from top of wall height, maximum.	40[b]	E or F	8	12
	≥ 70 pcf: 40 inches from for the top of wall to 80 inches from top of wall height, maximum.	55[b]			
	≥ 90 pcf: 80 inches from top of wall to bottom of wall.	85			
non load-bearing	50 to 100[d]	~~>~~≥ 60 psi < 60 psi[b]	E or F	9	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.45 kg

a. Density is to be measured at equilibrium moisture content. Average wall density shall be within +/- 5 pcf of the tabulated value.

b. Requires an *approved* engineered design per Section AU106.6.

c. Cob thickness only. The interior and exterior cob faces shall be permitted to be unfinished or receive any plaster finish allowed by this appendix.

d. Cob walls with more than one density shall be built with heavier densities below lighter densities.

e. Minimum cob wall thickness shall be whichever is greater in Table AU105.3, Table AU106.11(1) and Table AU108.1.

f. Wall thicknesses less than 10" require an engineered design.

Commenter's Reason: In both opposition testimony and comments by the IRC Committee inaccurate statements were made at the CAH

that created unwarranted doubt or confusion about this proposal. These include that multiple tests are required for an assembly or material to be given a fire-resistance rating in the code; that only one test had been performed; and that the proposal did not specify material makeup requirements to ensure that constructed rated walls would match what was tested. In addition to refuting those incorrect assertions, this Public Comment rewords some of RB310-22's code language to address legitimate concerns raised at the CAH and makes other improvements for greater clarity.
First, the language in the IRC and IBC indicates that a fire-resistance rating can be attained for an assembly by passing the required test, in this case ASTM E119 or UL 263 for walls. There is no language in the code requiring multiple tests to receive recognition as a rated assembly. Only that the required test is performed by an approved lab, is successful, properly documented, and that the code requirements for the rated assembly or material match what was tested, all of which the proposed code change in RB310 does. The proposed Table AU108.1 provides options by carefully matching what was tested to what is required for a fire-resistance rated cob wall. Additional footnotes further clarify the limitations and requirements in this table.

This is not a case where the tested walls barely passed the fire tests, or that a change in material makeup allowable in Appendix AU could affect the fire-resistance of the wall. Two full-scale 2-hour ASTM E119 tests were conducted with virtually no heat rise on the cool side of the wall, and both then passed the hose stream test. Importantly, the same materials required or allowed for cob walls in this appendix and this code change proposal – clay soil, sand and straw - have been used for centuries to build ovens and kilns specifically because of their ability to contain fire.

Cob density is governed by the proportion of straw in the mix. Within the material requirements of Appendix AU and density range tested and allowed in this proposal, there is no material makeup that wouldn't easily achieve a 2-hour rating. Furthermore, Appendix AU requires a shrinkage test (Section AU103.4.1) for *all* cob mixes, to minimize or eliminate cracking in service. This ensures that a rated cob wall subjected to fire, regardless of its exact material makeup, will not contain cracks that could compromise its ability to perform to its rated fire-resistance.

As stated in support testimony, the original proposal for Appendix AU for the 2021 IRC included a 1-hour fire-resistance rating without an ASTM E119 or UL 263 test, which drew opposition that resulted in disapproval at the 2019 CAH. A subsequent public comment removed the fire rating, resulting in the approval of Appendix AU. RB310-22 directly follows the recommendations of the committee and those who spoke in opposition, by conducting the needed testing and providing associated code provisions for those rated walls. The testing conducted and documented is more than adequate to support the proposed fire-resistance ratings for the cob walls described in RB310.

It should be noted that the fire-safety experts who opposed Appendix AU's original proposal because of the lack of testing, were consulted about the ASTM E119 tests conducted and the test results were shared with them in preparation for the RB310 code change proposal. They testified in support of RB310 at the CAH. Also, individuals who testified in opposition to the current proposal at the CAH were engaged before the Public Comment was submitted. Misunderstandings were clarified and we attempted to address their concerns.

Second, two cob walls were tested, each with differing densities and thickness, and both easily passed ASTM E119 2-Hour tests, including the hose stream test. Several comments in testimony claimed only one test was performed. Laboratory reports of the tests were and are available at a linked website (see below) along with other supporting information.

Third, the specifics of the two tested walls are reflected in the requirements in RB310's Table AU108.1, with corresponding densities, compressive strength, reinforcement, and thickness. One tested wall contained three densities from bottom to top, that all performed exceedingly well in the test. The other wall was of a different, single density. Thus, four different densities ranging from 50 pcf to 100 pcf, were tested and proven to easily pass the 2-hour E119 fire test.

Fourth, for important context: Australia has had standards for earthen wall systems including for fire safety for decades. The Australian Earth Building Handbook, HB195-2002, in Section 4.6 Fire Resistance Level, states, "In the absence of specific test data, the general fire resistance level (FRL) of earth walls satisfying the minimum thickness requirements outlined in Clause 4.3.4 may be taken as not greater than 120/120/120, or 90/90/90 where wall thickness is less than 200 mm." Clause 4.3.4 Structural Adequacy states: "Minimum recommended thicknesses for mud brick, stabilized pressed block and rammed earth are as follows: External walling - 200 mm, Internal walling - 125 mm. The minimum wall thickness for poured earth and cob wall construction is also recommended to be 200 mm, though in practice wall thickness will often exceed this value."

The three numbers in the FRL represent minutes before failure for structural adequacy/integrity/insulation. In other words, the time for the wall to be able to maintain a load, maintain its integrity, and before heat increase on the unheated side of the wall exceeds accepted limits. Thus, Australia gives a 2-hour fire resistance rating for a 200 mm (7.87") earth wall, including for cob walls.

Further, Australian Standard AS 3959-2009, "Construction of Buildings in Bushfire-Prone Areas," was produced in response to the many severe bushfires they have suffered. Based on the actual performance of earthen wall buildings in Australia, mud brick with a minimum thickness of 90mm (3.54”) is listed as one of only three exterior wall materials allowed to be used in the highest bushfire exposure zones without need of additional testing (the other two being full masonry and concrete). The minimum thickness of cob walls in this public comment is 8 inches, more than double the minimum thickness in the Australian standard.These Australian documents are available via the supporting documents link: https://www.cobcode.org/cobcode-documents

See photo below of one of two cob wall specimens tested at the independent testing laboratory.

Bibliography: The test reports and other supporting documents for this Public Comment as well as the code change proposal and the original proposal for Appendix AU are available for download and review here: https://www.cobcode.org/cobcode-documents

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This change simply offers options for tested fire-resistance-rated cob walls, which are no more costly than non-rated cob walls.

Final Hearing Results

RB310-22	AMPC1

RB312-22

Original Proposal

IRC: AW101.1

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Scott Campbell, NRMCA, NRMCA (scampbell@nrmca.org)

2021 International Residential Code

Revise as follows:

AW101.1 Scope. Buildings, structures and building elements fabricated in whole or in part using 3D-printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this appendix and other applicable requirements in this code.

Exception: This Appendix shall not be applicable to 3D printed buildings constructed of concrete.

Reason: Experience in the field of construction 3D printing of concrete, an understanding of research in that field, and an understanding of the construction industry demonstrates that there is no consensus indicating that the material property tests called out in UL 3401 are representative of 3D printing technologies used for construction or that this particular standard in its current state considers all of the material properties necessary for a structural engineer to properly perform design calculations or ensure the safety of personnel during construction.
If this approach remains in the IRC, the concern is that this technology will be implemented for a short period of time, but will ultimately meet its demise due to issues in construction as there is not a consensus regarding construction and engineering design procedures that are addressed by this appendix. There is a lot to consider when a manufacturing method is adopted for use in construction, especially when expectations are often that structural systems are intended to last 100 years. There are many cases in construction where lack of oversite of construction considerations, such as connection or proper building energy performance (both of which have not been addressed for 3D printed construction), have led to failures in building systems. In an industry that can't accept failure, early adoption may lead early abandonment of the technology.

UL 3401 called out in this appendix does not incorporate the conclusions of current research in the field of 3D printed concrete construction. In terms of cementitious materials there is consensus that the act of 3D printing results in a difference in material strength from cast materials and that this strength differs based on element orientation (Ma et al 2018, Wolfs et al 2019, Panda et al 2017, Sanjayan et al 2018). The tests called out in UL3401 only account for vertical loading of elements with layers perpendicular to the load direction and does not account for other loading directions that may result in differences in material performance. This assumes that either this is the worst-case scenario or that buildings only undergo loading in the vertical direction. Not accounting for anisotropy does not provide an engineer with enough information to properly design for all loading conditions that a structure may experience.

Additionally, research has shown that material properties of printed materials are not the same as cast materials since they are extruded and not consolidated in a mold, which results in variation in materials performance. Therefore, tests like ASTM C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete are not applicable, since the test requires casting and consolidation of materials so that steel studs can be embedded for placement in the measuring device. Material performance also depends on layer height and so the test specimen sizes need to be sufficient enough to account for statistical variation in material properties due to layer height or variation in specimen dimensions based on layer height. As the ASTM tests referenced in the standard are intended for cast specimens, and such variations are not addressed in the standard, this material variation cannot be addressed by this proposal in its current state.

The most critical omission is that the UL 3401 does not account for very early age properties of cementitious materials, which is a potential construction site or facility safety issue. The standard specifically calls out slump tests (ASTM C143 or ASTM C1611). This type of test, while widely used in the field, is not applicable to printable concrete/mortars. It does not provide measurements required for determine stability of prints. Reliance on this test will lead to materials that are not printable or result in on-site safety issues. Concrete 3D printing processes can be done safely but rely on stability of the print, as there is no formwork. This requires an understanding of the yield strength, flow characteristics, elastic modulus gain over time, and strength gain over time (Perrot 2015, Roussel 2018, Wolfs 2018, Suiker 2020, Jayathilakage 2020). The slump test does not provide the level of detail required for an engineer to perform construction load and stability calculations.

While it is understood that this appendix is intended to only address the determination of material properties and printer systems, it is unclear based on the tests if design considerations were included in the determination of the material tests chosen. In general, whether for cementitious or polymeric type materials, there is a lack of publicly available studies or understanding in the structural load testing of representative components or systems for engineering applications found in construction that conclude that results from these tests can be used for design purposes. This applies whether these items are being used for structural or architectural applications. With this gap in research, it is unclear whether 3D printed elements or their connections using material values from this proposal can be properly designed for structural applications. Properties being investigated by concrete industry experts include but are not limited to: analytical methods; anchorage; bond between layers; cleanouts; durability; rheology; reinforcement types, placement and positioning; shrinkage; strength; thixotropy; time to bond; time to set; use of polymers; and viscosity.

While the appendix might be appropriate for other materials, it is not appropriate for additive manufacturing using concrete. Test and evaluation techniques used for conventional cast-in-place concrete are not sufficient and may not be appropriate for additive manufacturing using concrete. 3D printing of concrete buildings should remain an alternative means and methods until such time that the concrete industry experts develop appropriate inspection, testing, design, materials, and construction practices with an understanding of properties and performance. Designs and construction using 3D printers still can comply through Section R104.11 Alternative materials, design and methods of construction and equipment.

Bibliography: Ma et al 2018, Wolfs et al 2019, Panda et al 2017, Sanjayan et al 2018, Perrot 2015, Roussel 2018, Wolfs 2018, Suiker 2020, Jayathilakage 2020

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal excludes concrete systems from compliance with Appendix AW. It does not preclude the use of 3D printed buildings, but based on current concrete technology, encourages alternative means and methods for approval of 3D printed concrete buildings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal for the appendix for 3D-printed Building Construction was approved because there is considerable lack of data that is required for the additive manufacturing using concrete. The ACI representative spoke against the use of concrete in this type of construction. Since both the opposition and proponents considered the materials used concrete, more work is needed on this issue in the codes. There was concern that there were no 3D-printing manufactures or installing representatives present so that there was input from what is going on in the field. (Vote: 8-1)

Final Hearing Results

RB312-22 AS

RB313-22

Original Proposal

IRC: AW103.1
Proponents: Scott Campbell, NRMCA, NRMCA (scampbell@nrmca.org)

2021 International Residential Code

Revise as follows:

AW103.1 Design <u>process</u>~~organization.~~ ~~3D-printed buildings, structures and building elements shall be designed by an organization certified in accordance with UL 3401 by an *approved* agency and approved by the building official in accordance with this section.~~<u>Designs shall be completed in accordance with the professional licensing requirements of the local jurisdiction and building code and designs shall be approved pursuant to the local jurisdiction's planning and review process.</u>

Reason: The requirement that the design of buildings, structures and building elements be performed by entities approved by a 3rd party organization is contrary to the professional licensing laws in all jurisdictions. A professional license is the legal requirement to perform design in the area of expertise of the licensee and, along with compliance with the building code, is sufficient for the design of any structure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change to construction practice is proposed. If anything, this proposal will decrease the cost of construction by eliminating a requirement for 3rd party certification of the design professional.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: This proposal for the appendix for 3D-printed Building Construction was disapproved because of issues with the language, especially with dealing with the professional licensing requirements. Not all jurisdictions will have a planning review process dedicated to 3D-printed construction. (Vote:9-0)

Public Comments

Public Comment 1

Proponents: Jonathan Roberts, UL, UL (jonathan.roberts@ul.com); Scott Campbell, NRMCA, NRMCA (scampbell@nrmca.org) requests As Modified by Public Comment

Replace as follows:

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<u>**AW103.1 Fabrication process.**</u> <u>The process used to fabricate the 3D-printed building construction shall be evaluated by an approved agency in accordance with UL 3401.</u>

~~AW103.1~~ <u>AW103.2</u> Design organization. 3D-printed buildings, structures and building elements shall be designed by <u>a registered design professional based on a report of findings prepared *by approved agency*</u> ~~an organization certified~~ in accordance with UL 3401. ~~by an~~

~~*approved* agency and approved by the building official in accordance with this section~~.

~~AW103.2~~ AW103.3 Design approval. The structural design, *construction documents* and UL 3401 report of findings shall be submitted for review and approval in accordance with Section 104.11.

Commenter's Reason: This public comment addresses concerns raised at the CAH about the reference to design organization. This public comment clarifies the responsibilities of the approved agency that certifies the 3D printed construction process and materials in accordance with UL 3401, and the registered design professional that designs the specific building or structure that utilizes the 3D printing process, and submits plans to the code official. These will typically be two separate organizations.

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 construction practice is proposed. If anything, this proposal will decrease the cost of construction by eliminating a requirement for 3rd party certification of the design professional.

Final Hearing Results

RB313-22	AMPC1

RB314-22

Original Proposal

IRC: (New), APPENDIX AY (New), AY101 (New), AY101.1 (New), AY101.1.1 (New), AY101.2 (New), AY102 (New), AY201.1 (New), SECTION 202 (New), AY103 (New), AY103.1 (New), AY104 (New), AY104.1 (New), AY104.1.2 (New), AY104.1.3 (New), AY104.1.4 (New), AY105 (New), A105.1 (New), AY105.2 (New), AY105.3 (New), AY105.4 (New)

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

2021 International Residential Code

Add new text as follows:

Users note. *The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*
About this appendix: *Appendix AY provides for the design and construction of accessory dwelling units (ADUs), an alternative to two- and multi-family residential construction that promotes increased housing supply and affordability.*

APPENDIX AY ACCESSORY DWELLING UNITS (ADUs)

AY101 GENERAL

AY101.1 Scope. ADUs proposed for existing residential construction shall be in accordance with this appendix, other applicable requirements in this code and shall not exceed the scoping limitations of Section R101.2.

AY101.1.1 Prohibited Conditions. An ADU shall not be permitted within:

1. Live/work units located in townhouses.
2. Owner-occupied *lodging houses* with five or fewer guestrooms.
3. A care-facility with five or fewer persons receiving medical care or custodial care within a*dwelling unit.*
4. A care-facility with five or fewer persons receiving care within a single-family dwelling.

AY101.2 Conditions. ADUs shall be permitted without requiring a *change of occupancy* to either a two-or multi-family *dwelling* where in compliance with all of the following:

1. Only one ADU shall be permitted for each primary dwelling unit.
2. The owner of a property containing an ADU shall reside in either the primary dwelling unit or the ADU, as of the date of permit approval.
3. An ADU shall have a separate house number from the primary dwelling unit.
4. ADUs shall be secondary in size and function to the primary dwelling unit and shall comply with all of the following limits.
   - 4.1. Not less than 190 square feet (17.65 m^2) in area.
   - 4.2. Not more than 50 percent of the area of the primary dwelling unit.
   - 4.3. Not more than 1,200 square feet (111 m^2) in area.
5. An ADU shall be provided with a separate entrance than that serving the primary dwelling unit either from the exterior of the building or from a common hallway located within the building.

6. An ADU shall have a maximum number of two bedrooms.
7. The location of a detached ADU shall comply with Section R302.
8. An ADU shall be provided with adequate provisions for electricity, water supply and sewage disposal.

AY102
DEFINITIONS

AY201.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

Add new definition as follows:

ACCESSORY DWELLING UNIT (ADU). An additional, subordinate dwelling unit on the same lot, that is entirely within a dwelling unit, attached to a dwelling unit, or in a detached structure.

Add new text as follows:

AY103
PERMITS

AY103.1 Required. Any owner or owner's agent who intends to construct an ADU within an existing or proposed building or structure shall first make application to the building official and obtain the required permit.

AY104
ADU PLANNING

AY104.1 Design. Except as modified by this section, building planning shall be in accordance with Chapter 3 and building structure shall comply with Part III of this code.

AY104.1.2 Means of egress. The path of egress travel from an ADU to a public way or to a yard or court that opens to a public way shall be independent of, and not pass through the primary dwelling unit.

AY104.1.3 Fire separation. For ADUs adjoining the primary dwelling unit, the 1-hour fire-resistance rated wall and floor assembly provisions of Section R302.3 shall not be required provided that both of the following conditions have been met:

1. The interconnection of smoke alarms per Section R314.4 activates the smoke alarms in both the primary dwelling unit and the ADU.
2. The interconnection of carbon monoxide alarms per Section R315.5 activates the carbon monoxide alarms in both the primary dwelling unit and the ADU.

AY104.1.4 Smoke and carbon monoxide alarms. For ADUs adjoining the primary dwelling unit, the interconnectivity of smoke alarms and carbon monoxide alarms may be independent for the primary dwelling unit and the ADU provided that a 1-hour fire-resistance rating is provided for walls and floor assemblies as per R302.3.

AY105
UTILITIES

A105.1 Heating, ventilation and air-conditioning systems. A primary dwelling unit and an ADU shall be provided with:

1. A separate heating system.
2. Separate ducting for heating and cooling systems. Return air openings for heating, ventilation and air-conditioning shall not be taken from another dwelling unit.
3. Separate climate controls.

AY105.2 Electrical systems. A primary dwelling unit and an ADU shall be provided with:

1. Ready access to the service disconnecting means serving the dwelling unit.
2. Ready access for each occupant to all overcurrent devices protecting the conductors supplying the dwelling unit in which they reside.

AY105.3 Gas piping. A primary dwelling unit and an ADU shall be provided with:

1. Ready access to shutoff valves serving the dwelling unit in which they reside.
2. Ready access to appliance shutoff valves serving appliances in the dwelling unit in which they reside.

AY105.4 Water service. A primary dwelling unit and an ADU may share a common potable water system provided that there are separate, accessible main shutoff valves allowing the water to be turned off on one-side without affecting the other.

Reason: Accessory dwelling unit (ADU) is a term already in use across the United States – including Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, the District of Columbia, Florida, Hawaii, Idaho, Illinois, Indiana, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, North Carolina, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, Vermont, Virginia, Washington, and Wisconsin. However, the definition of an ADU and associated code requirements vary significantly not only state to state, but from jurisdiction to jurisdiction. Changes were made to the *International Zoning Code* (IZC) during the recent Group A Code Development Cycle to provide a definition and framework of requirements in an effort to create a uniform understanding of ADUs. It is also important to note the lack of building codes and standards has created circumstances where the requirements are being determined through local and state legislative processes, instead of ICC's code change process, which is a consensus process driven by the knowledge and experience of code officials.

This code change proposal to create a new voluntary appendix to the IRC incorporates those portions adopted into the IZC that are not inextricably tied to zoning conditions, while adding fundamental building design criteria affecting life safety.

Section A _ 101

is nearly identical to the parameters established in the IZC. The distinctions being:

1) Clarifying language that creating / proposing an ADU does not automatically trigger a*change of occupancy* from a one-family to a two-family, or from a two-family to a multi-family, provided all conditions are met.

2) The IZC included one requirement affecting off-street parking which is beyond the scope of the IRC.

3) New language is provided that the additional design parameters for an ADU not addressed in this Appendix default back to the IRC.

4) New language makes it clear that ADUs within existing residential dwellings shall not be in addition to live/work units, lodging houses, or care facilities with five or fewer people.

As explained in the reason statement provided previously to the IZC:

Section A ....101.1 Conditions

propose eight (8) requirements that ensure the ADU does not become a "duplex" or second single-family home on the same lot. Should these conditions not be met, the proposed ADU must be considered as a separate *dwelling unit* with all applicable regulations of the IBC, IEBC, or IRC in effect.

· Item 1 re-affirms the subordinate nature of the ADU to the primary dwelling unit;

· Item 2 establishes an Owner-occupancy requirement;

· Item 3 requires a separate address for the ADU from the primary unit.

· Item 4 sets size parameters for the ADU.

o The minimum square footage of 190 SF aligns with the IBC minimum for an efficiency unit.

o The maximum size is based on a comparison of requirements in effect in CO, OR, MA, CA, and VA which ranged from 750 SF to 1,400 SF; most between 1,000 SF and 1,200 SF.

o A similar comparison between percentages of the primary unit showed 30% to 50% with more jurisdictions favoring the higher value.

· Item 5 requires a separate entrance to prevent a house that has a second kitchen (such as a recreation room in a basement with a cooking area), but are not an ADU from being mandated to meet the ADU requirements.

· Item 6 limits the unit to two bedrooms to minimize parking demands normally associated with zoning ordinances while still allowing the ADU to address housing market demands and cost concerns.

· Item 7 is a pointer to the multiple buildings on a single lot requirements of Section R302.

· Item 8 recognizes the need for an ADU to have adequate utilities.

Section A__102 creates two definitions matching those added to the IZC. The first recognizes the common parlance of an Accessory Dwelling Unit (ADU) and points to the second definition, which describes the use more accurately as a subset of a *dwelling unit* defined in Chapter 2.

The content of the definition for an ADUwas developed based on similarities found in existing Zoning ordinances in effect around the United States, and distinguishing the difference between and ADU and a Two-Family Dwelling; i.e., the subordinate nature of the size and function to the primary or second dwelling unit. Though subordinate is not a defined term in Chapter 2, there is precedent in the I-Codes for using the term (for example see the IZC definitions for *Accessory Building* – "an incidental subordinate building…" and *Home Occupation* – "the partial use of a home for commercial or nonresidential uses by a resident thereof, which is subordinate and incidental…"

The definition is intended for integration throughout the I-Codes, as further code development cycles address specific code regulations for the IBC, and IEBC, depending on the type of ADU proposed. This definition recognizes that an ADU features the same components of a dwelling unit in terms of living, sleeping, eating, cooking and sanitation which presently can only be defined in the I-Codes as a *dwelling unit*. The reality is that the application of the ADU concept in different jurisdictions is inconsistent, and at times may allow deviation from the full requirements the code prescribes for a two-family dwelling unit arrangement. It is necessary to recognize the unique circumstances wherein an ADU must comply with those two-family dwelling unit requirements, and when alternative arrangements are acceptable that do not compromise the health, safety, and welfare of the Public. The definition also recognizes that the ADU can either be within the primary dwelling unit (such as in the basement of a single-family home) or a detached accessory structure (similar to a detached garage).

The definition avoids non-enforceable provisions such as if the ADU is rented, the relationship between the person(s) in the ADU and the primary dwelling, and characteristics that would preclude placement within the IBC, IEBC, IRC, and IZC.

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establishes consistent permitting criteria for an ADU as is expected for a*dwelling unit*.

Section A__104 establishes that the design of an ADU is similar in most respects to a*dwelling unit* but with a few allowances to avoid triggering a change of occupancy. The most important distinction pertains to an ADU that adjoins the primary dwelling unit whereby the design professional may consider an either / or proposition regarding the installation of fire-resistance rated separations tantamount to a two-family dwelling **or** making the smoke alarm and carbon monoxide alarms interconnected between both the primary and accessory dwelling units.

Section A__105 establishes consistency for both the primary and accessory dwelling units to access to / control of the utility connections affecting their respective spaces.

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 does not increase nor decrease the cost of construction. The proposal creates a voluntary appendix allowing someone to build an accessory dwelling unit within a building legally constructed in accordance with the IRC. No one is under any obligation to build an ADU, nor are they required to plan for the construction of a future ADU.

For someone choosing not to construct an ADU these code provisions will not be applicable; there are no cost implications.

For someone choosing to construct an ADU these code provisions are applicable; the cost of construction will increase proportionally to the size of the project. According to an article titled *Calculating the Costs of Building an ADU* published on the BuildinganADU.com blog, the average cost for an ADU from 2016-2019 based on their research is as follows:

- Detached New Construction: $305/SF
- Basement ADU: $265/ SF
- Attached ADU: $300/ SF
- Garage Conversion: $297/ SF
- Detached New Construction Above a Garage: $212/ SF

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
AY101.1Scope. ADUs proposed for existing residential construction shall be in accordance with this appendix, other applicable requirements in this code <u>and the existing building together with the ADUs</u> shall not exceed the scoping limitations of Section R101.2.

AY101.2Conditions. ADUs shall be permitted without requiring a *change of occupancy* ~~to either a two-or multi-family *dwelling*~~ where in compliance with all of the following:

<u>1.</u> <u>An ADU shall be permitted within an existing single-family detached dwelling or within an existing townhouse unit, that is within the scope of the IRC.</u>

~~1.~~<u>2.</u> Only one ADU shall be permitted for each primary dwelling unit.

~~2.~~<u>3.</u> The owner of a property containing an ADU shall reside in either the primary dwelling unit or the ADU, as of the date of permit approval.

3.4. An ADU shall have a separate house number from the primary dwelling unit.

~~4.~~<u>5.</u> ADUs shall be secondary in size and function to the primary dwelling unit and shall comply with all of the following limits.

~~4.1.~~<u>5.1</u> Not less than 190 square feet (17.65 m^2) in area.

~~4.2.~~<u>5.2</u> Not more than 50 percent of the area of the primary dwelling unit.

~~4.3.~~<u>5.3</u> Not more than 1,200 square feet (111 m^2) in area.

~~5.~~<u>6.</u> An ADU shall be provided with a separate entrance than that serving the primary dwelling unit either from the exterior of the building or from a common hallway located within the building.

~~6.~~<u>7.</u> An ADU shall have a maximum number of two bedrooms.

~~7.~~8. The location of a detached ADU shall comply with Section R302.

~~8.~~9. An ADU shall be provided with adequate provisions for electricity, water supply and sewage disposal.

ACCESSORY DWELLING UNIT (ADU). An *addition* or *alteration* that is an additional, subordinate dwelling unit on the same lot, that is entirely within a dwelling unit, attached to a dwelling unit, or in a detached structure.

AY104.1Design. Except as modified by this section, building planning shall be in accordance with Chapter 3 and building structure shall comply with the *International Residential Code* ~~Part III of this code~~.

Committee Reason: This creates a new Appendix for accessory dwelling units which are becoming very prevalent across the the country, and the guidance that's presented in here is needed and the community will benefit from it. This provides a first start for future development of this topic and this is important towards improving availability affordable housing. There were concern expressed about adding more appendices to the IRC with accessory and dwelling unit being well understood terms, and there are no huge groundbreaking changes in this appendix to support a new appendix.
The modification to Sections AY101.1 and AY101.2 modify clarifies that the ADU with the current building has to be within the scope of the IRC. The modification to Section AY104.1 corrects the compliance for design to the IRC as opposed to Part III of this code since that reference is only in the electronic version of the codes and not the printed version. The modification to the definition Accessory Dwelling Unit is needed to coordinate the definition with the clarifications of scope in Section AY101.1 and AY101.2.(Vote 8-1)

Final Hearing Results

RB314-22	AM

RB315-22

Original Proposal

IRC: APPENDIX AY (New)

Proponents: Jay Crandell, P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Rob Brooks, Rob Brooks and Associates LLC, DuPont (rob@rtbrooks.com)

2021 International Residential Code

Add new text as follows:

APPENDIX AY EXTENDED PLATE WALL CONSTRUCTION

SECTION AY101
GENERAL

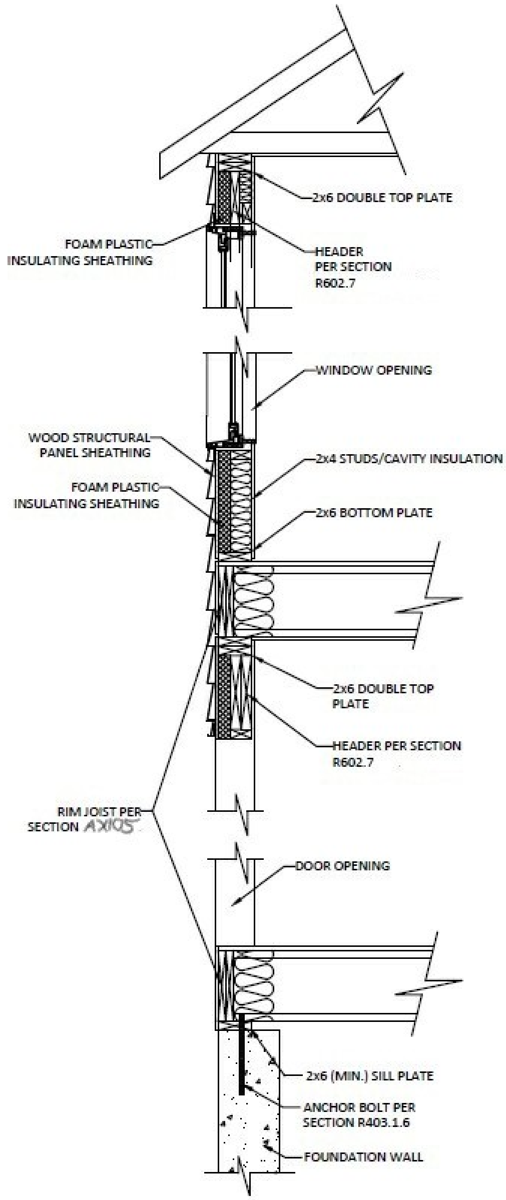
AY101.1 General. Detached one- and two-family or townhome buildings using extended plate wall (EPW) construction shall comply with the *International Residential Code* and all of the following:

1. Not more that two stories above grade plane in height.
2. Limited to Seismic Design Categories A and B as determined from Figures R301.2.2.1(1) through (6).
3. Limited to ultimate design wind speeds no more than 115 mph as determined from Figure R301.2(2).
4. Comply with the provisions of Section R602 of the *International Residential Code*, except as modified by the provisions of this Appendix.

Exception: Buildings using EPW construction in accordance with an *approved* design by a *registered design professional*.

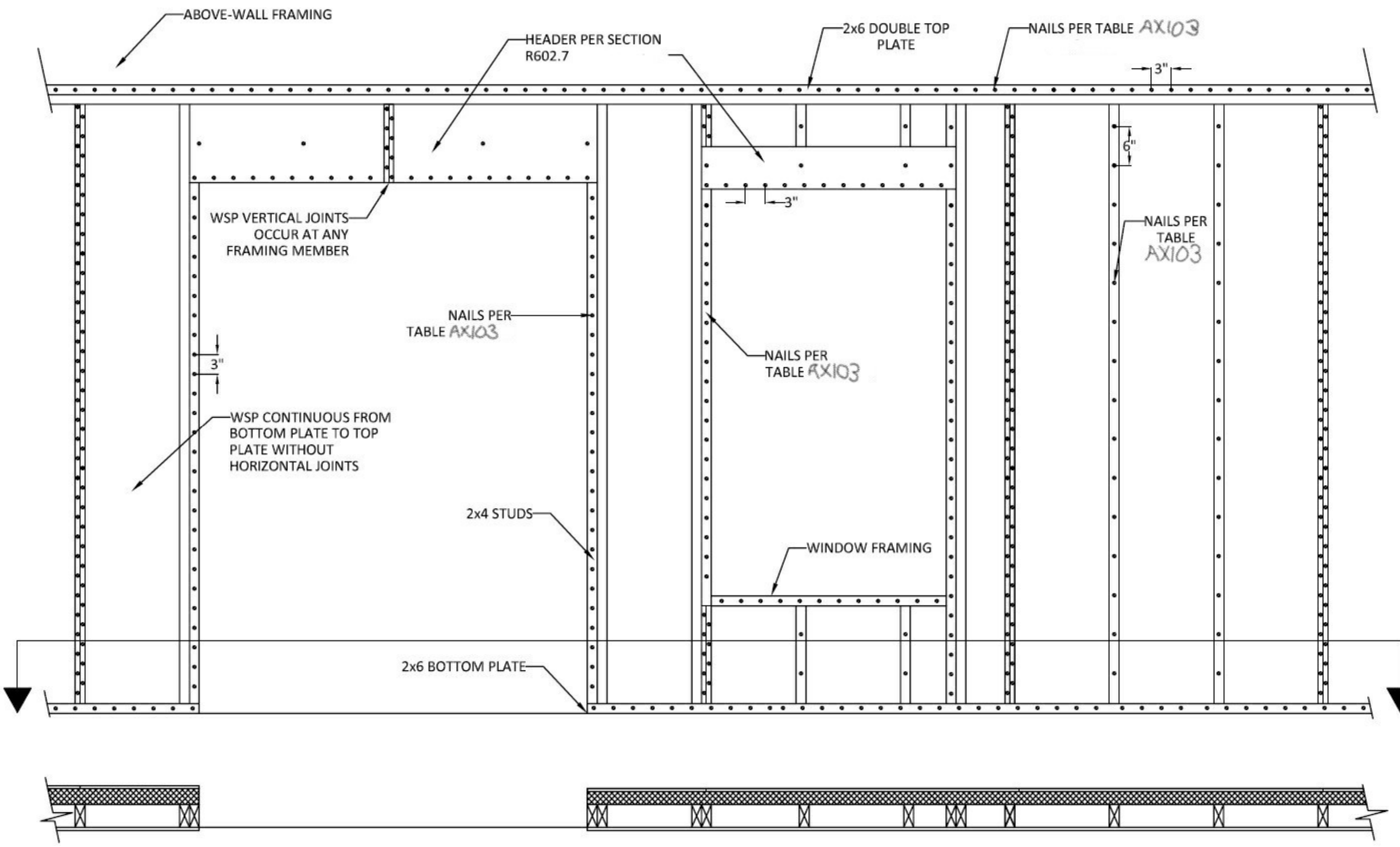
SECTION AY102
CONSTRUCTION REQUIREMENTS

AY102.1 Framing. The 2x6 top and bottom plates and 2x4 studs shall be used in accordance with Figures AY102.1(1) and AY102.1(2). A single top plate shall not be permitted. Wall framing shall comply with requirements for 2x4 framing in accordance with Section R602 of the *International Residential Code*.



(Reference in note on bottom left should be to AY102.4)

FIGURE AY102.1(1) Extended Plate Wall (EPW) Construction, Section View



(Reference in Figure should be to AY102.2 (6 locations))

FIGURE AY102.1(2) Extended Plate Wall, Elevation View

AY102.2 Wood structural panel sheathing. Wood structural panel sheathing with a nominal thickness of 7/16-inch (11 mm) to 1/2-inch (12.7mm) shall be installed vertically and attached to wall plates and studs in accordance with Table AY102.2 and Figure AY102.1(2). The vertical joints between adjacent wood structural panels shall occur only at framing members. Where used as part of wall bracing, each wood structural panel shall be installed without horizontal joints between the extended top and bottom plates.

TABLE AY102.2 Sheathing Fastener Requirements for EPW

Minimum Nail Length and Diameter	Maximum Fastener Spacing	
	At Perimeter of Wood Structural Panels (inches)	In Field of Wood Structural Panels (inches)
No. 37 Power-tool Driven Common Nail (3-1/2" x 0.131")[a,b,c]	3" O.C.	6" O.C.
16d Box Nail (3-1/2" x0.135")[a,cd]	3" O.C.	6" O.C.

For SI: 1-inch = 25.4 mm

a. At top and bottom plates where the wood structural panel is in direct contact with the framing, 8d common nail (2-1/2" x 0.131") shall be permitted.

b. Full round head nail with minimum head diameter of 0.281 inches (7 mm).

c. Nails are in accordance with ASTM F1667.

AY102.3 Wall bracing. Wall bracing for EPW construction shall comply with the requirements for WSP or CS-WSP or CS-G bracing methods in Section R602.10 of the *International Residential Code*, except that the sheathing fasteners shall comply with Table AY102.2.

AY102.3.1 Simplified wall bracing. With the exception of Section R602.12.2 Item 2, provisions of Section R602.12 of the*International Residential Code* shall be applicable to EPW construction. The fastening schedule for wood structural panels shall comply with Table AY102.2.

AY102.4 Rim joist. Rim joists supporting an EPW shall comply with Figure AY102.4(1) or Figure AY102.4(2). Sawn 2x lumber or engineered wood rim board shall be used to construct rim (band) joists. Engineered wood rim board shall comply with Section R602.1.7 of the *International Residential Code*. The minimum bearing length requirements for the floor joists shall be satisfied or joists shall be supported with metal hangers.

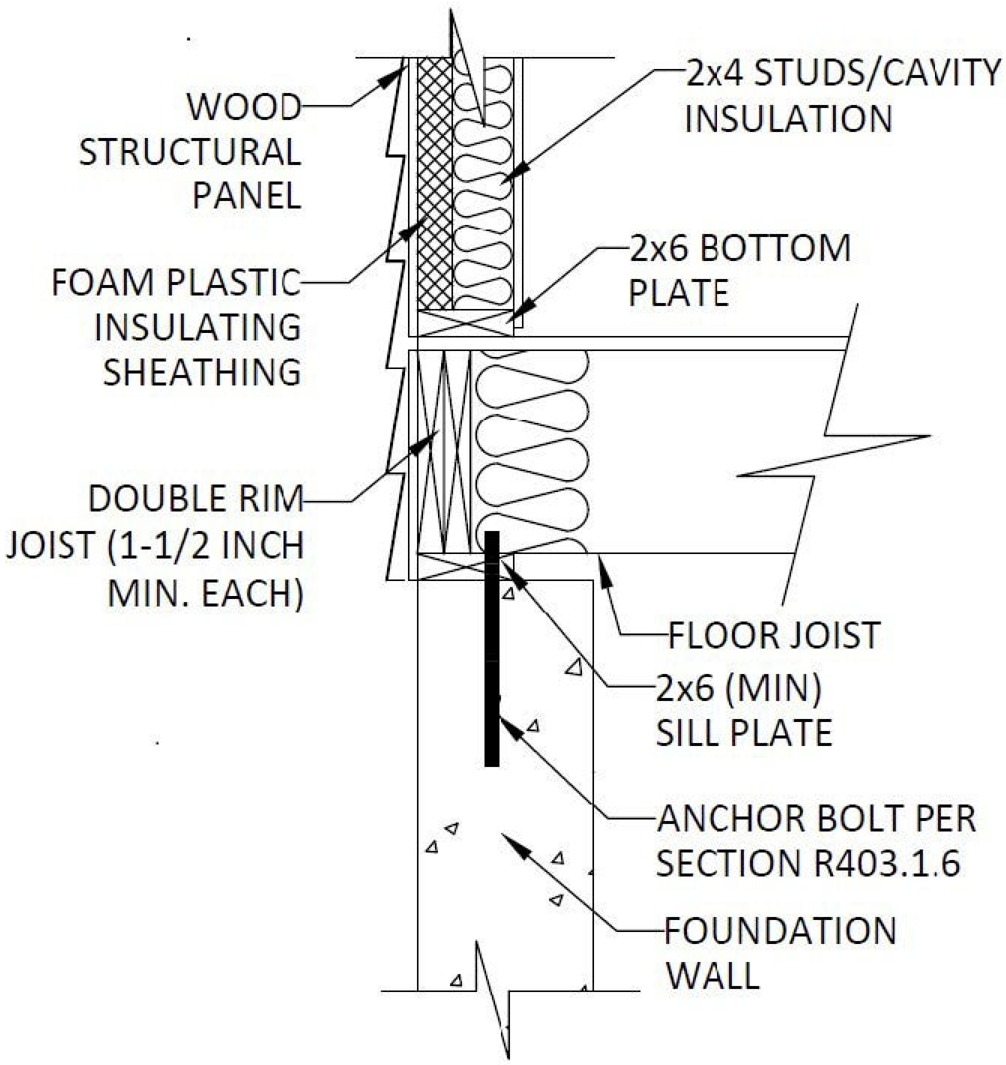


FIGURE AY102.4(1) Rim Joist Construction for EPW - Double Member

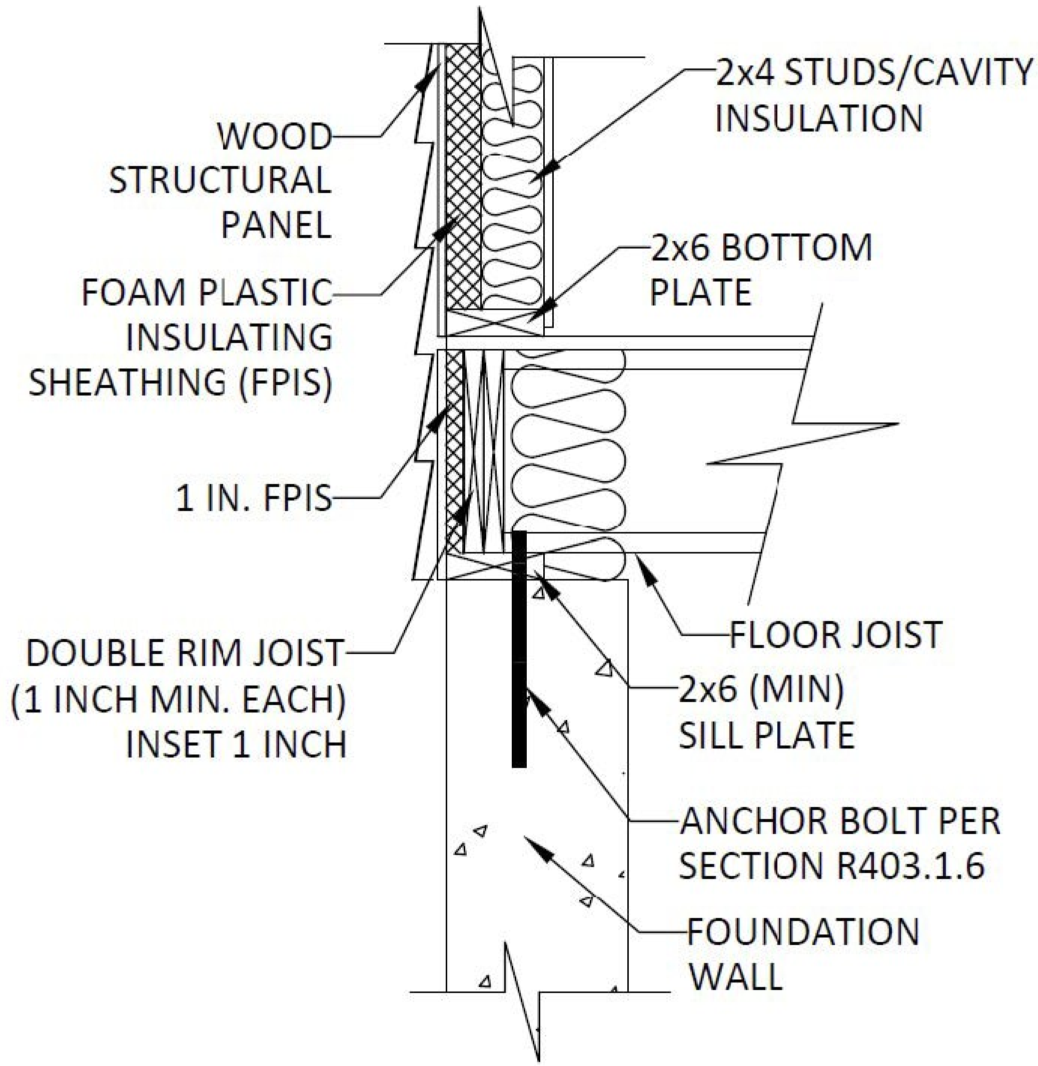


FIGURE AY102.4(2) Rim Joist Construction for EPW - Inset Double Member

AY102.4.1 Rim joist used as rim header. Wood rim boards, or band joists, that serve as rim board headers shall be constructed in accordance with Section R602.7.2 of the *International Residential Code*.

AY102.5 Foam plastic insulating sheathing. Foam plastic insulating sheathing with a total thickness of 2 inches (51 mm) shall be installed between top and bottom plates directly to the exterior surface of the 2x4 studs and flush with the 2x6 top and bottom plates as shown in Figure AY102.1(1). The foam plastic insulating sheathing shall comply with ASTM C578 or ASTM C1289 with a minimum compressive strength of 15 psi and shall be permitted to be installed in one or more layers.

AY102.6 Cladding attachment. Cladding shall be specified and installed in accordance with Section R703 of the*International Residential Code* and one of the following:

1. Table R703.3.3 for siding attachment to wood structural panels only.
2. Table R703.8.4(2) for brick tie-spacing and attachment to wood structural panels only.
3. Fastening schedule and fasteners as required by Table R703.3(1), except fastener length shall be selected to meet or exceed the minimum required penetration into framing.

AY102.7 Uplift connections. Where roof uplift tie-downs are required in accordance with Section R802.11 of the*International Residential Code*, the roof tie-downs shall be fastened to either side of the double top plate or, where required to be fastened to studs, shall be installed on the interior face of the EPW in accordance with manufacturer's installation instructions. Where uplift forces determined in accordance with Section R602.3.5 require approved uplift connectors between floors or between foundation and the floor, these uplift connectors shall not rely on wood structural panel sheathing for resisting the wind uplift forces.

Reason: Jay Crandell, P.E., representing FSC:
This proposal includes requirements for Extended Plate Wall (EPW) construction in a non-mandatory appendix to the IRC, alongside other innovative construction methods found in other appendices. Where this proposed appendix is adopted, EPW construction will provide a practical compliance option for meeting energy code requirements for above-grade walls using conventional wood framing materials. EPW construction uses standard framing, sheathing, fastening and insulating materials configured for optimized constructibility and performance. The EPW framing system has been extensively evaluated in the lab and in practice for its structural performance, moisture performance, energy performance and constructibility in the field by the Home Innovation Research labs (see website link in the Bibliography for various technical reports, guides, and resources). The evaluations were funded by the USDA's Forest Products Laboratory, U.S. Department of Energy, New York State Energy Research and Development Authority, and the American Chemistry Council. Four demonstration homes have been constructed and have been occupied and in successful use for many years. The wall system can be assembled in the field or fabricated in a factory for on-site installation. Based on the scope of the evaluations, the proposed system is limited to low-seismic and low-wind areas. For conditions outside of the scope limitations, the proposal requires an approved engineering design.

Rob Brooks, RBA, representing DuPont:

The 2021 IECC has expanded the optional prescriptive use of continuous insulation to include much of the US covered by Climate Zones 3-8. This has increased interest in, and the need for, cost-effective and innovative methods to construct wood frame, above-grade residential walls with continuous insulation. DuPont, together with the government agencies listed in the FSC reason statement have partnered to offer an alternative wall framing method that uses 2x4 studs and 2x6 plates, complete with installation instructions. The construction method was designed to impact the fewest possible trades.

Testing of the EPW method was completed in 2017, training guides were produced in 2018, and a 2021 IRC code change proposal was introduced in 2019 for Section R602. The proposal was disapproved citing the need for engineering oversight of a system that could go up to 3 stories in height, higher wind and seismic areas with wind uplift.

This code change proposal adds further conservatism to the 2021 IRC proposal by using the following:

1) Adding these provisions through an Appendix, giving jurisdictions the option to adopt this construction method.

2) Limited the applicable areas to Seismic A and B, and wind speeds less than 115 mph.

3) Limit the building height to two stories or less.

4) Adding language to address wind uplift.

Bibliography: www.homeinnovation.com/EPW

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This framing method is an alternative to existing framing methods and will not increase the cost of construction. Where continuous insulation is to be installed, this method will decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The new appendix for Extended Plate Construction was approved because this is an option for conventional framing with limited application because of the height and seismic zone limitations in this appendix. This was developed collaboratively and information on construction is readily available. Previous committees asked this same group to come back with this option as an appendix. This is a good starting point and is an options worth putting in an appendix.
There were concerns about problems associated with load tracking from the roof to the foundation as well as some lateral concerns. This system would not meet the current requirements for wood construction in the IRC. (Vote: 7-2)

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: This proposal was approved as submitted by committee based on adequacy of the proposed provisions as documented by collaborative research and testing by the Home Innovation Research Labs (HIRL) and actual homes constructed using the extended plate wall method, including three case studies sponsored by USDA Forest Products Lab (USDA-FPL), New York State Energy Research and Development Agency (NYSERDA), and the DOE Building America Program. The research, testing, and case studies are documented at www.homeinnovation.com/EPW .
As the committee indicated, “this is a good starting point and is an option worth putting in an appendix”. Hearing testimony also highlighted that the extended plate construction method uses conventional wood framing materials and methods and is at least as valid as other appendices addressing alternative construction materials and methods such as straw-clay construction, cob construction, and strawbale construction. Further, application of the appendix is conservatively restricted to low wind and seismic regions, two story construction or less, among other limitations. For these reasons, the proponents believe a strong consensus was achieved and we ask that you sustain the committee action for approval as submitted.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
The non-mandatory appendix offers an optional construction method that does not change the cost of construction because it is an option that doesn't change any of the existing construction options in the base code. If the appendix is adopted, it can result in a decrease in cost of compliance with the building and energy codes.

Final Hearing Results

RB315-22	AS

RB316-22

Original Proposal

IRC: AY101 (New)

Proponents: Jacob Waddell, US Hemp Building Association (President@ushba.org); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT (strawnet@gmail.com); Mary Dempsey, Mpactful Ventures, PBLLC (mary@mpactfulventures.org); Anthony Dente, PE, Verdant Structural Engineers (anthony@verdantstructural.com); Kiko Thébaud, Kiko Thébaud, Architect (kikothebaud@gmail.com); Cameron McIntosh, Americhanvre LLC, Americhanvre LLC (cameron@americhanvre.com); Matt Marino, Homeland Hempcrete, Homeland Hempcrete (matt@homelandhempco.com); Anastasiya Konopitskaya, Coexist Build LLC, Coexist Build LLC (ana@coexist.build); Chris Magwood, Endeavour Centre, Endeavour Centre (chris@endeavourcentre.org); Graham Durrant, Hemp-Lime Spray Limited (hemplimespray@yahoo.com); Tim Callahan, Self (t.l.callahan@icloud.com); Matthew Mead, Hempitecture Inc., Hempitecture Inc. (mattie@hempitecture.com); Jennifer Martin, HempStone LLC, HempStone LLC (jennifer@hempstone.net); Tom Rossmassler, Hempstone, LLC (tom@hempstone.net); C Michael Donoghue, Maritech Engineering, Inc, Maritech Engineering, Inc (cmd@maritechengineering.com); Anthony Néron, DuChanvre (info@duchanvre.com); Marilynn Hill, Self (knowledgeisliving@yahoo.com); Laurent Goudet, AKTA, Expert hemp concrete builder; Sergiy Kovalenkov, Hempire International, Hempire International (sergiy@hempire.tech); Dion Lefebvre, North America, 8th Fire Innovations, Divita Hemp Block (8thfireinnovations@gmail.com)

2021 International Residential Code

Add new text as follows:

APPENDIX AY
HEMP-LIME CONSTRUCTION

SECTION AY101
GENERAL

AY101.1 Scope. This appendix shall govern the use of hemp-lime as a nonbearing building material, and wall infill system in Seismic Design Categories A, B, and C, and in Seismic Design Categories D_0, D_1, and D_2 with an *approved* engineered design by a *registered design professional* in accordance with Section R301.1.3.

SECTION AY102
DEFINITIONS

AY102.1 General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

BINDER. The material that binds the hemp hurd in a hemp-lime mix.

BONDING COAT. The initial thin layer of binder-rich granulated plaster used in lined applications of hemp-lime construction to ensure adhesive and/or mechanical bonding. Also known as gobetis.

CAST-IN-PLACE. Installation of hemp-lime mix by hand or by spraying into forms in its permanent location.

CASTING. Placing wet hemp-lime into forms.

CLAY. Inorganic soil with particle sizes less than 0.00008 inch (0.002 mm) and having the characteristics of high dry strength and medium to high plasticity, used as a binder of other component materials in clay plaster.

CLAY SUBSOIL. Subsoil sourced directly from the earth, containing clay, sand and silt, and containing not more than trace amounts of organic matter.

FIBER CLUMPS. Long fibers that are attached to hemp hurd, or for other reasons, cause clumping of fibrous balls when agitated.

FINISH. Exposed surface material on the interior or exterior face of a hemp-lime infill wall.

FORM. The material into which hemp-lime infill, panels, or blocks are cast.

FORMWORK. The system of forms, their bracing and fasteners assembled for casting of hemp-lime infill.

HAND CAST. Hemp-lime infill cast by placing hemp-lime mix into formwork and evenly tamping by hand or with a tool.

HEMP. A class of the Cannabis sativa plant grown for industrial purposes in which the concentration of total delta-9 tetrahydrocannabinol (THC) in the flowering tops is equal to or less than the regulated maximum level established by authorities having jurisdiction.

HEMPCRETE. Common usage term for hemp-lime.

HEMP-LIME. A bio-aggregate composite consisting of hemp hurd and a lime-based binder. Also known as hempcrete.

HEMP HURD. The chopped woody core of the stalks of the hemp plant, stripped of its surrounding hemp fibers. Also known as hemp shiv or shive.

INFILL. Hemp-lime placed between or around the structural or nonstructural framing of a building as insulation, thermal mass, and a substrate for finish.

LIFT. A horizontal layer of hemp-lime infill.

LIME. Lime is composed of calcium hydroxide ($Ca(OH)_2$) including Type N or S hydrated lime, hydraulic lime, natural hydraulic lime or slaked quicklime.

LINED APPLICATION. Installation of a vertical hemp-lime layer, lining a masonry or concrete wall.

NATURAL CEMENT. Hydraulic cement made from naturally occurring limestone.

NONBEARING. Not bearing the weight of the building other than the weight of the hemp-lime infill and its finish.

PLASTER. Lime, clay, clay-lime, or hemp-lime plaster as described in Section AY104.3, applied to the interior or exterior face of hemp-lime walls.

POZZOLAN. A siliceous or alumino-siliceous material that when finely divided and combined with hydrated lime in the presence of water forms new chemical compounds with cementitious properties.

PRECAST. Blocks or panels of hemp-lime formed and cured before installation.

SCREEDING. Removal of excess material to form a planar surface.

REED MAT. A mat consisting of reed, cane, bamboo, or other similar plant material.

SPRAY-APPLIED. A method of mechanical projection of hemp-lime applied onto or into a form using compressed air.

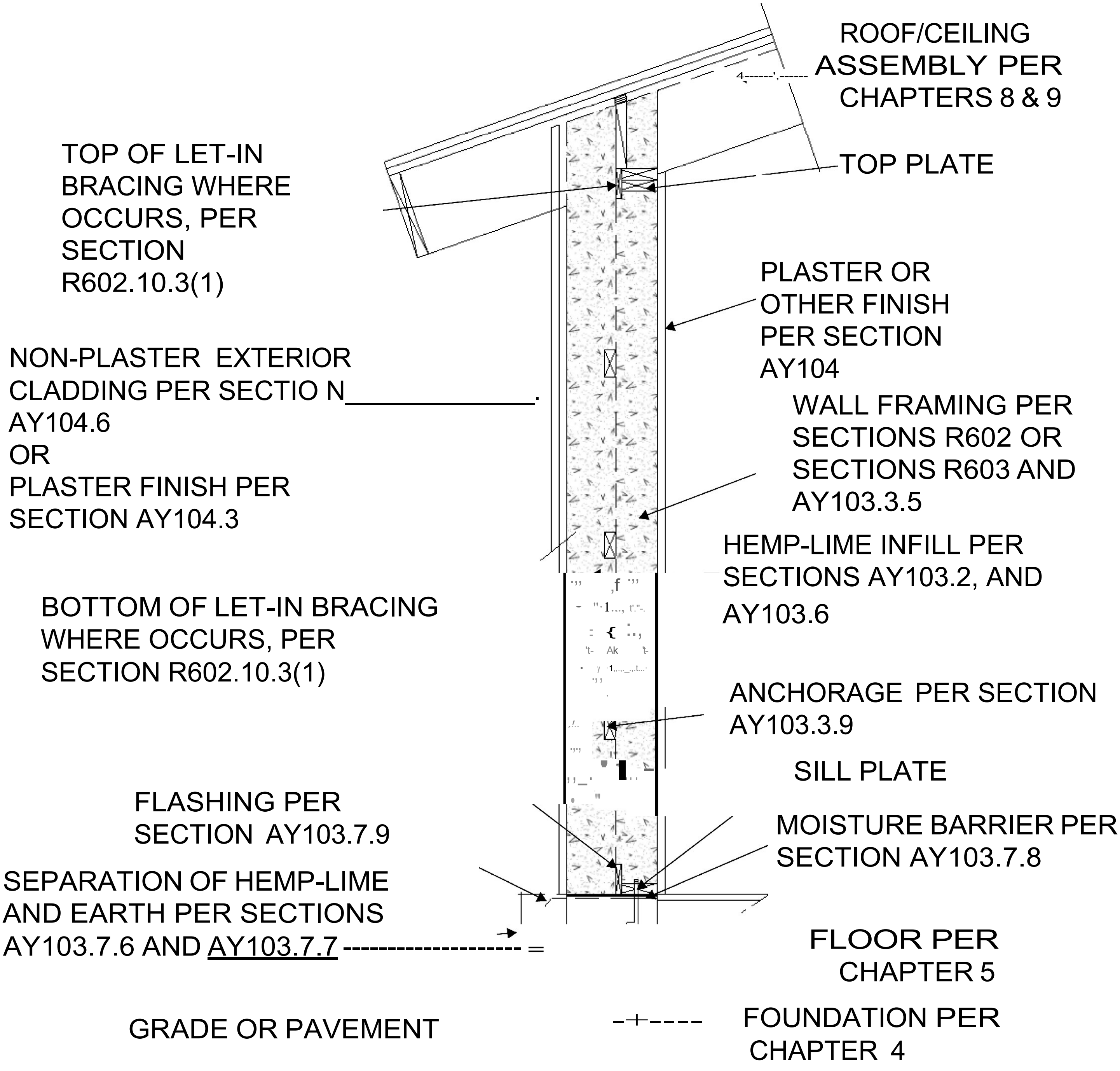
TADELAKT. A lime-plaster which is compressed, polished, and treated with oil-based soap to make it water-repellant.

UNIT WALL WEIGHT. The unit wall weight is the calculated weight of a 1 foot by 1 foot (305 mm by 305 mm) section of wall surface area times the full wall thickness, including finishes. The unit wall weight is the sum of the weight of each constituent material times its volume, expressed as psf.

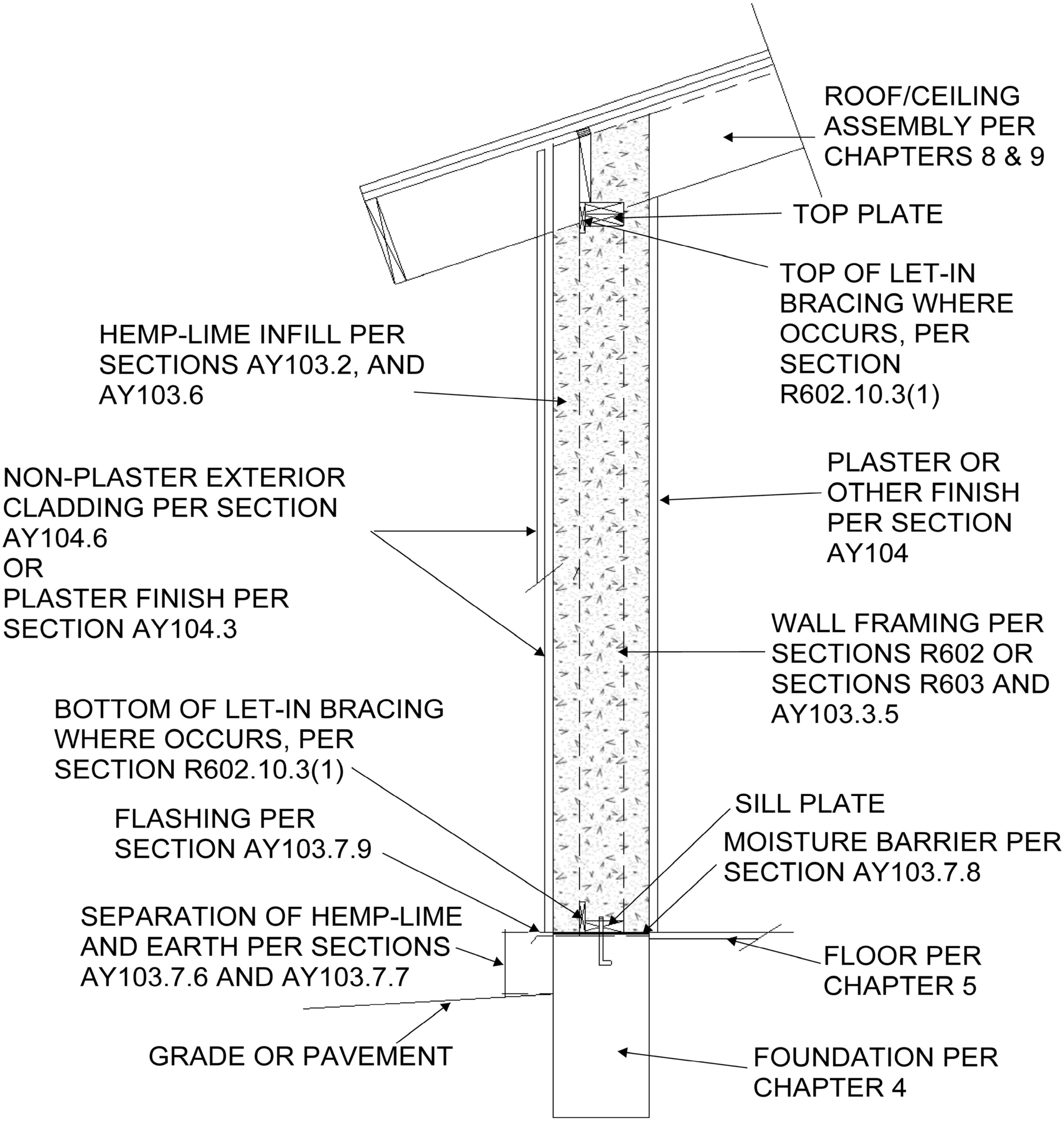
VOID. Any space in a hemp-lime wall greater than ¼ inch (6 mm) wide, 2 inches (51mm) long and 2 inches (51 mm) deep.

SECTION AY103
HEMP-LIME CONSTRUCTION

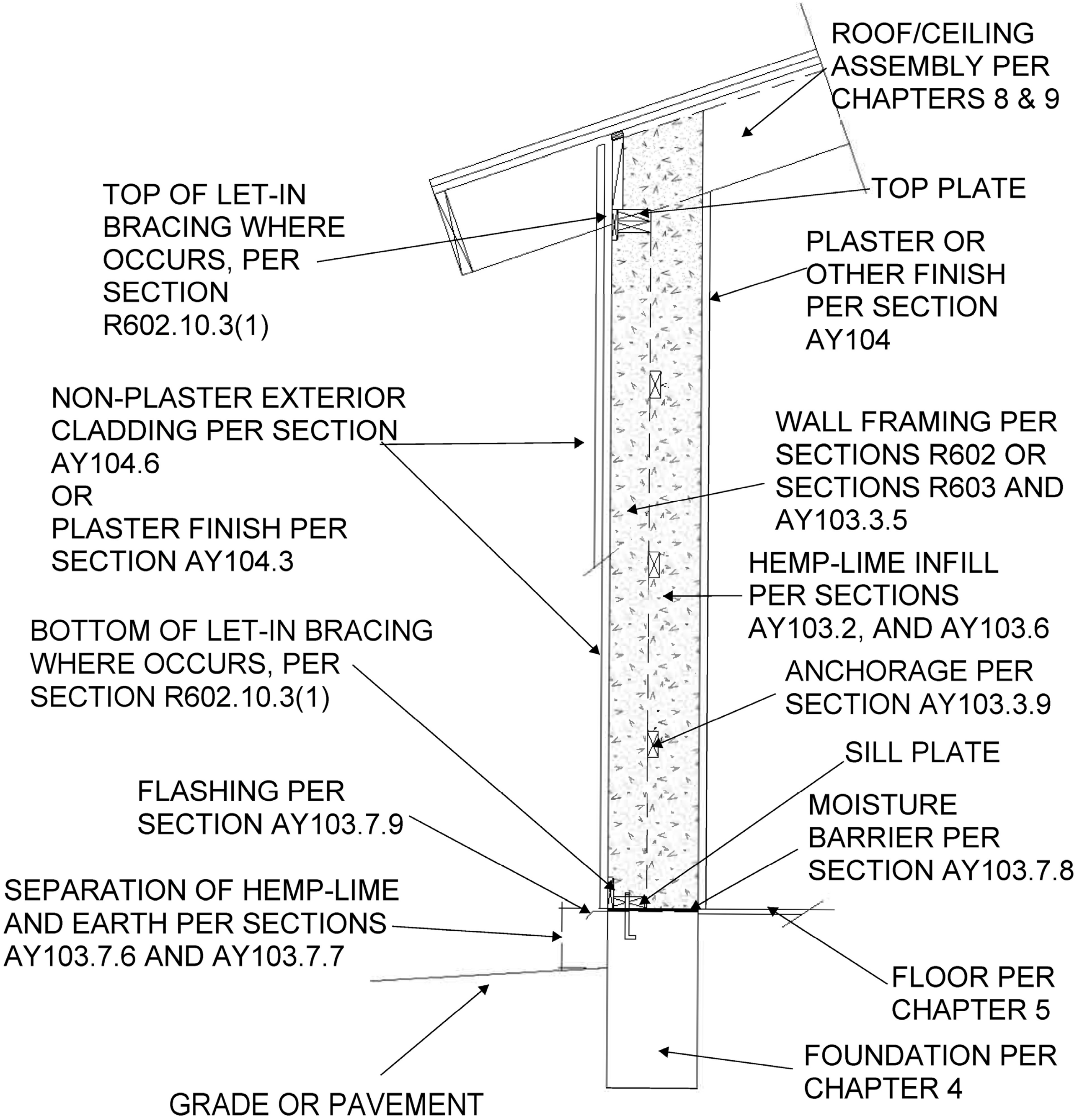
AY103.1 General. Hemp-lime construction shall be limited to the non-structural, solid *infill* mix of *hemp hurd* and its *binder* between or around structural and non-structural wall framing. Hemp-lime *infill* shall have a density ranging from 12.5 lb/ft^3 to 25 lb/ft^3 (200 kg/m^3 to 400 kg/m^3). Hemp-lime walls shall be designed and constructed in accordance with Section AY103 and with Figures AY103.1(1) through AY103.1(4) or an *approved* alternative design.



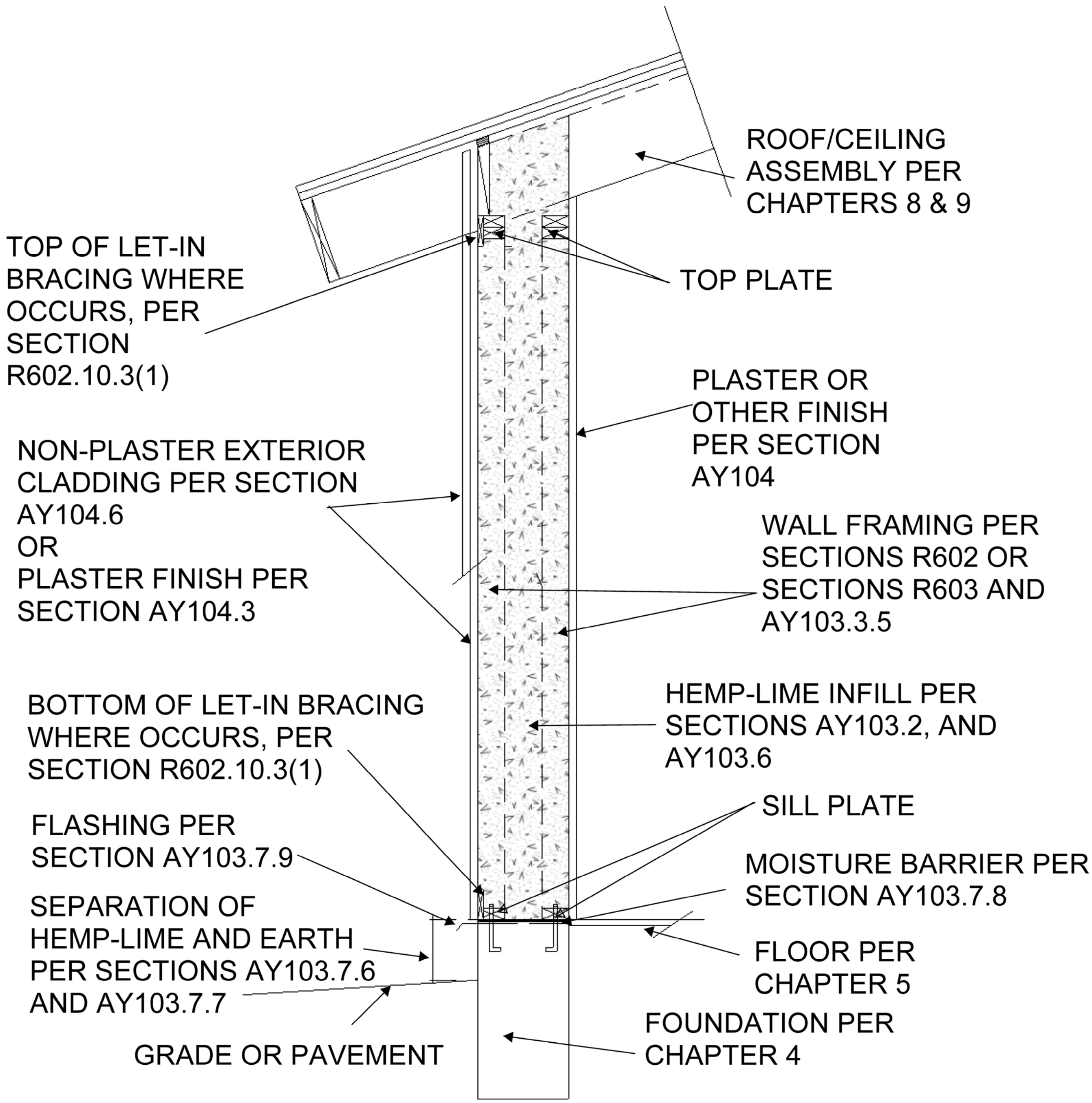
AY103.1(1) TYPICAL HEMP-LIME WITH INTERIOR STUD FRAMING



AY103.1(2) TYPICAL HEMP-LIME WITH CENTER STUD FRAMING



AY103.1(3) TYPICAL HEMP-LIME WITH EXTERIOR STUD FRAMING



AY103.1(4) TYPICAL HEMP-LIME WITH DOUBLE STUD WALL FRAMING

AY103.2 Materials. Materials to be used in hemp-lime construction shall be in accordance with Sections AY103.2 through AY103.2.3.

AY103.2.1 Hemp hurd. *Hemp hurd* shall match the specifications of the *approved* test samples in Sections AY106.3 and AY107.1. *Hemp hurd* shall be substantially free from dust and *fiber clumps* such that the installed hemp-lime maintains its integrity.

AY103.2.2 Binders. Acceptable *binders*, singular or in combination, include hydraulic *lime*, hydrated *lime*, *pozzolans*, *natural cements*, or other *binders* that match the specification of the *approved* test samples in Sections AY106.3 and AY107.1.

AY103.2.3 Water and water additives. Water and any water additives shall match the specifications of the *approved* test samples in Sections AY106.3 and AY107.1.

AY103.3 Structure. The structure of buildings using hemp-lime *infill* shall be in accordance with the IRC and Sections AY103.3.1 through AY103.3.9 or with an *approved* engineered design by a *registered design professional*.

AY103.3.1 Limitations and requirements for buildings using hemp-lime infill. *Buildings* using hemp-lime *infill* shall be subject to the following limitations and requirements:

1. Number of stories: not more than one *story above grade plane.*
2. The building height shall not be more than 25 feet (7620 mm).
3. Braced wall panel lengths: in accordance with Section R602.10.3 and Section AY103.3.2.
4. Unit wall height: Hemp-lime walls shall not exceed an average *unit wall weight* of 65 pounds per square foot (217 kg/m^2).

AY103.3.2 Bracing. Bracing for buildings with hemp-lime *infill* in Seismic Design Categories A, B, and C shall be in accordance with Section R602.10 and in accordance with the following. Walls with hemp-lime *infill* shall use Method LIB and shall not be braced with solid sheathing. Hemp-lime *infill* walls utilizing Method LIB shall not require gypsum board to be installed and the minimum braced wall lengths listed in Section R602.10. Adjustment factors in Table R602.10.3(4) shall be used as applicable. Alternatively, hemp-lime *infill* walls shall comply with Section R301.1. Walls or wall sections without hemp-lime *infill* shall be permitted to use any bracing method allowed in Section R602.10.

AY103.3.3 Connection of light-frame walls to hemp-lime walls. Light-frame walls perpendicular to, or at an angle to a hemp-lime wall assembly, shall be fastened to the hemp-lime wall in accordance with Section R602 or R603.

AY103.3.4 Hemp-lime thickness. Hemp-lime *infill* shall be not less than 3 inches (76 mm) thick between face of framing and finish. Maximum hemp-lime wall thickness is limited by the average *unit wall weight* limit of 65 pounds per square foot (317 kg/m^2) in Section AY103.3.1, Item 4.

AY103.3.5 Contact with structural metal. Structural metal members and components in contact with hemp-lime shall be protected in accordance with Section AY103.4.

AY103.3.6 Contact with wood members. Hemp-lime shall be permitted to be in contact with untreated wood members.

AY103.3.7 Openings in walls. Door, window, and similar openings in hemp-lime walls shall be in accordance with the following:

1. Rough framing for doors and windows shall be part of, or be fastened to the wall framing in accordance with the IRC.
2. An *approved water-resistive barrier* shall be installed at openings in hemp-lime walls in accordance with Sections AY103.7.4 and AY104.5.1.
3. Header size and their maximum span above openings in bearing walls with hemp-lime *infill* shall be determined with Table R602.7(1) and Table AY103.3.7 or a design approved by a registered design professional
4. *Cast-in-place* hemp-lime over and overhanging the face of a header more than 3 inches (76 mm) shall require an *approved* design of its support by a *registered design professional*.
5. Hemp-lime blocks overhanging headers shall require an *approved* design of their support by a *registered design professional*.

TABLE AY103.3.7 ALLOWABLE HEADER SPAN MULTIPLIER[a]

WALL HEIGHT ABOVE HEADER	UNIT WALL WEIGHT (psf)			
	15	30	45	65
1'-0"	1.00	1.00	1.00	1.00
1'-6"	1.00	1.00	0.90	0.90
2'-0"	1.00	0.90	0.90	0.85
2'-6"	1.00	0.90	0.90	0.85
3'-0"	1.00	0.90	0.90	0.80

a. Multiply the maximum allowable spans from Table R602.7(1) by the applicable factor to determine the adjusted maximum allowable header span.

AY103.3.8 Voids. *Voids* shall be filled with hemp-lime or other *approved* material before application of finish.

AY103.3.9 Anchorage of hemp-lime. Hemp-lime for interior and exterior stud walls shall be anchored, or shall be in accordance with an *approved* design by a *registered design professional.* Horizontal anchorage rails shall be installed at not more than 24 inches (610 mm) on center and in accordance with Figure AY103.1(1) and AY103.1(3). Horizontal anchorage rails shall be no less than 1 inch by 2 inch (25 mm by 51 mm). Anchorage rails shall be wood, metal per Section AY103.4, or other *approved* material. Anchorage rails should be attached to the side of the stud facing the interior of the wall with (1) - 8d box nail to each stud and run the entire length of the wall.

AY103.4 Contact with metal. Metal in contact with hemp-lime shall be stainless steel or primed and painted with a coating in accordance with Section AY103.4.1.

AY103.4.1 Protective coatings. Metal shall be painted with an epoxy, oil, bituminous paint or other *approved* coating. Water based paints shall not be used.

Exception: Heads of pneumatically driven hot-dip galvanized nails.

AY103.5 Mechanical, electrical and plumbing in hemp-lime infill. Electrical and telecommunication wiring, panels, and boxes, mechanical ducts, plumbing pipes, and other mechanical, electrical and plumbing components in or in contact with hemp-lime *infill* shall be isolated in sleeves, pipes, conduits, or tubing made of plastic, or of metal in accordance with Section AY103.4, or separated from hemp-lime with an *approved* alkaline-resistant material.

AY103.6 Hemp-lime installation methods. Hemp-lime shall be installed in accordance with Sections AY103.6.1 and AY103.6.2, and one of Sections AY103.6.3 through AY103.6.7.

AY103.6.1 Mix and mixing. The materials and ratio of *hemp hurd* to *binder* to water shall match the specifications of the *approved* test samples in Sections AY106.3 and AY107.1. The water to *binder* ratio shall be not less than 1:1 and not greater than 2:1 by weight or by *binder* manufacturer's recommendations. The *hemp hurd*, *binder*, and water shall be thoroughly and uniformly mixed by manual or mechanical means.

AY103.6.2 Formwork for hand cast and spray-applied methods. *Forms* shall be removable or permanent and shall not deform under the lateral pressure of the installed wet hemp-lime.

AY103.6.2.1 Permanent forms. Permanent *forms* shall be permitted to be installed on only one side. Permanent *forms* shall be *reed mats*, or other *approved* materials with an open weave. Sheet materials shall not be used as permanent *forms*. Permanent *forms* remain after curing as a finish or substrate for another finish.

Exception: Permanent *forms* of any material shall be permitted at the jambs, heads, and sills of openings.

AY103.6.2.2 Removable forms. Removable *forms* shall be removed within 24 hours after hemp-lime placement or per the *binder* manufacturer's specifications.

Exception: Removable *forms* temporarily supporting hemp-lime *infill* above wall openings shall not be removed for a minimum of 3 days or per *binder* manufacturer's specifications.

AY103.6.3 Hand cast. Hand cast hemp-lime *infill* shall be installed in uniform *lifts* not greater than 4 inches (102 mm) in height. Each *lift* shall be tamped to achieve stable walls free of *voids*.

AY103.6.4 Spray-applied. *Spray-applied* hemp-lime *infill* shall be installed in accordance with Sections AY103.6.4.1 through AY103.6.4.4.

AY103.6.4.1 Forms. *Forms* shall be installed on one side in accordance with Section AY103.6.2 or AY103.6.7.2 for *lined applications*.

AY103.6.4.2 Mixing. Mixing shall be in accordance with Sections AY103.6.1 or the spray equipment manufacturer's instructions.

AY103.6.4.3 Installation. Hemp-lime shall be sprayed from the base up and per the spray equipment manufacturer's and/or *binder* manufacturer's instructions.

AY103.6.4.4 Screeding. Excess hemp-lime shall be removed by *screeding* per the spray equipment manufacturer's and/or *binder* manufacturer's instructions.

AY103.6.5 Precast blocks. *Precast* hemp-lime blocks shall be cast and installed in accordance with Sections AY103.6.5.1 through AY103.6.5.5 or per manufacturer's specifications:

AY103.6.5.1 Block dimensions. Hemp-lime blocks shall be a minimum thickness of 3 inches (76 mm) in all dimensions and shall not exceed the maximum thickness in accordance with Section AY103.3.4.

AY103.6.5.2 Casting. Hemp-lime blocks shall be cast in accordance with Sections AY103.6.1 through AY103.6.6 as applicable, or by other means that produce *approved* blocks.

AY103.6.5.3 Mortar. Mortar shall consist of *lime* and sand or other aggregate with a ratio of not less than 1:1 and not greater than 1:3, or other *approved* mortar. The *lime* shall be hydrated Type N or S, or hydraulic *lime*.

AY103.6.5.4 Installation. Hemp-lime blocks shall be installed in a running bond between and around wall framing members. Mortar shall fill all voids between blocks and shall not be not less than ⅛ inch (3 mm) thick. Spaces between blocks and framing shall be not more than ¾ inch (19 mm) and shall be filled with mortar.

AY103.6.5.5 Hemp-lime block veneer. Hemp-lime block veneer shall not exceed 50 pounds per square foot (244 kg/m^2) of veneer only *unit wall weight*, shall be limited to 5-inch (127 mm) thickness, and shall be anchored to the supporting wall studs in accordance with Section R703.8.4 or secured with *approved* ties and fasteners to an *approved* backing. Metal ties and fasteners shall be protected in accordance with Section AY103.4.

AY103.6.6 Hemp-lime panels. Hemp-lime panels shall require an *approved* design by a *registered design professional*.

AY103.6.7 Lined application. Interior and exterior hemp-lime *lined applications* shall be installed in accordance with Section AY103.6.7.1 through AY103.6.7.6 and Sections AY103.6.3 through AY103.6.6 as applicable.

AY103.6.7.1 General. Prior to installation, the concrete or masonry walls receiving the installation shall be clean, and free of loose mortar. Lined installations on basement walls shall require an *approved* design by a *registered design professional*. Exterior applications shall be in accordance with Section AY103.7.6. Attachment of *precast* blocks to the receiving wall shall be in accordance with Section AY103.6.5.5. Attachment of hemp-lime panels to the receiving wall shall be in accordance with Section AY103.6.6.

AY103.6.7.2 Formwork. *Forms* shall be in accordance with Section AY103.6.2. Permanent *formwork* shall not be allowed on the non-receiving wall side.

AY103.6.7.3 Thin lining. Thin linings are from 3 to 4¾ inches (76 to 121 mm) thick. Hand troweled hemp-lime shall be installed over a *bonding coat*.

AY103.6.7.4 Medium lining. Medium linings exceed 4¾ inches (121 mm) and are not greater than 6½ inches (165 mm) thick. For *hand cast* or *spray-applied*, 1½ inch (38 mm) X 1½ inch (38 mm) dovetail shaped vertical anchorage rails shall be attached with the narrowest face to the receiving wall, spaced not less than 20 inches (508 mm) and not greater than 32 inches (813 mm), with fasteners not less than 2 feet (610 mm) and not greater than 3 feet (914 mm) apart. *Hand cast* medium linings shall be installed over a *bonding coat* on the receiving wall. See Figure AY103.6.7.4.

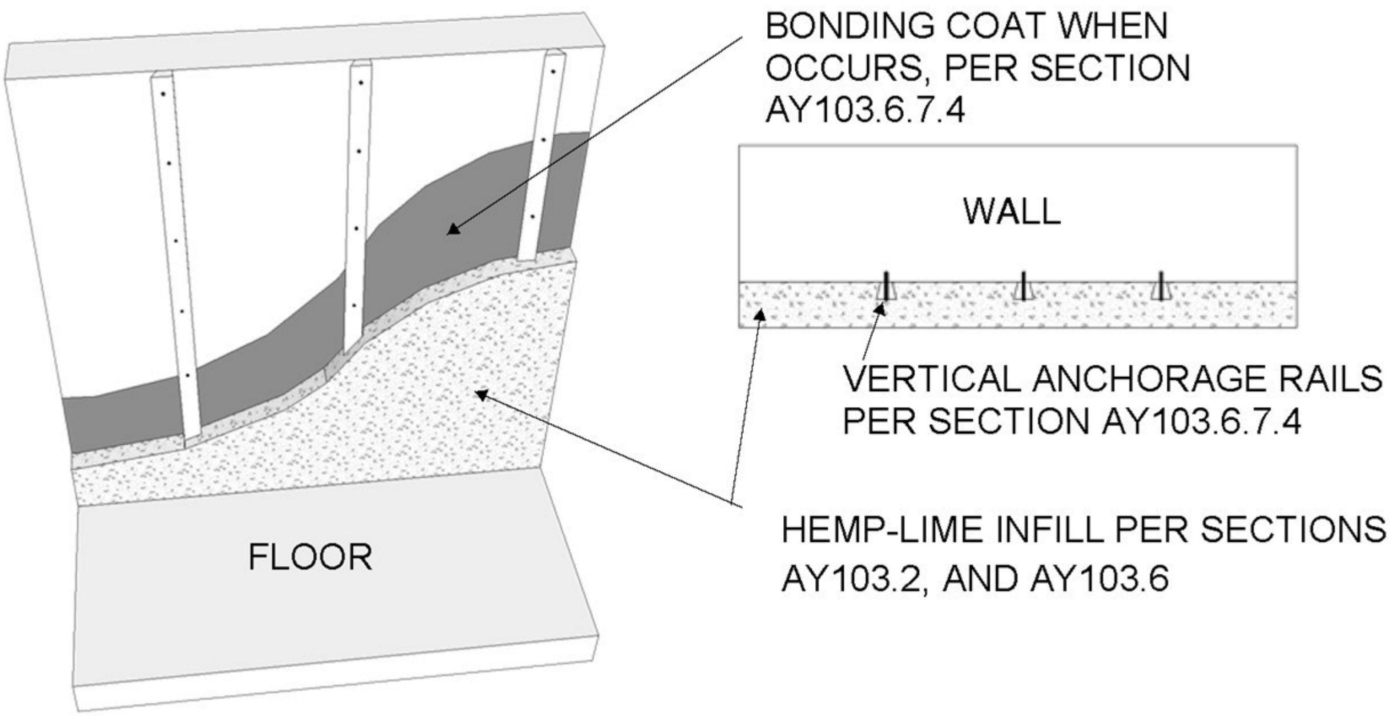


FIGURE AY103.6.7.4 TYPICAL HEMP-LIME MEDIUM LINING

AY103.6.7.5 Thick lining. Thick linings exceed 6½ inches (165 mm) and shall not be greater than 8 inches (203 mm) thick or per the binder manufacturer's specifications. For *hand cast* or *spray-applied*, 1½ inch (38 mm) x 2½ inch (64 mm) vertical anchorage rails shall be attached with the 2½ inch (64 mm) face parallel to the receiving wall and spaced not less than 20 inches (508 mm) and not greater than 32 inches (813 mm). The anchorage rails shall be fastened to and separated from the receiving wall with 2 inch (51 mm) spacers not less than 3 feet (914 mm) and not greater than 4 feet (1,219 mm) apart. *Hand cast* thick linings shall be installed over a *bonding coat* on the receiving wall. See Figure AY103.6.7.5.

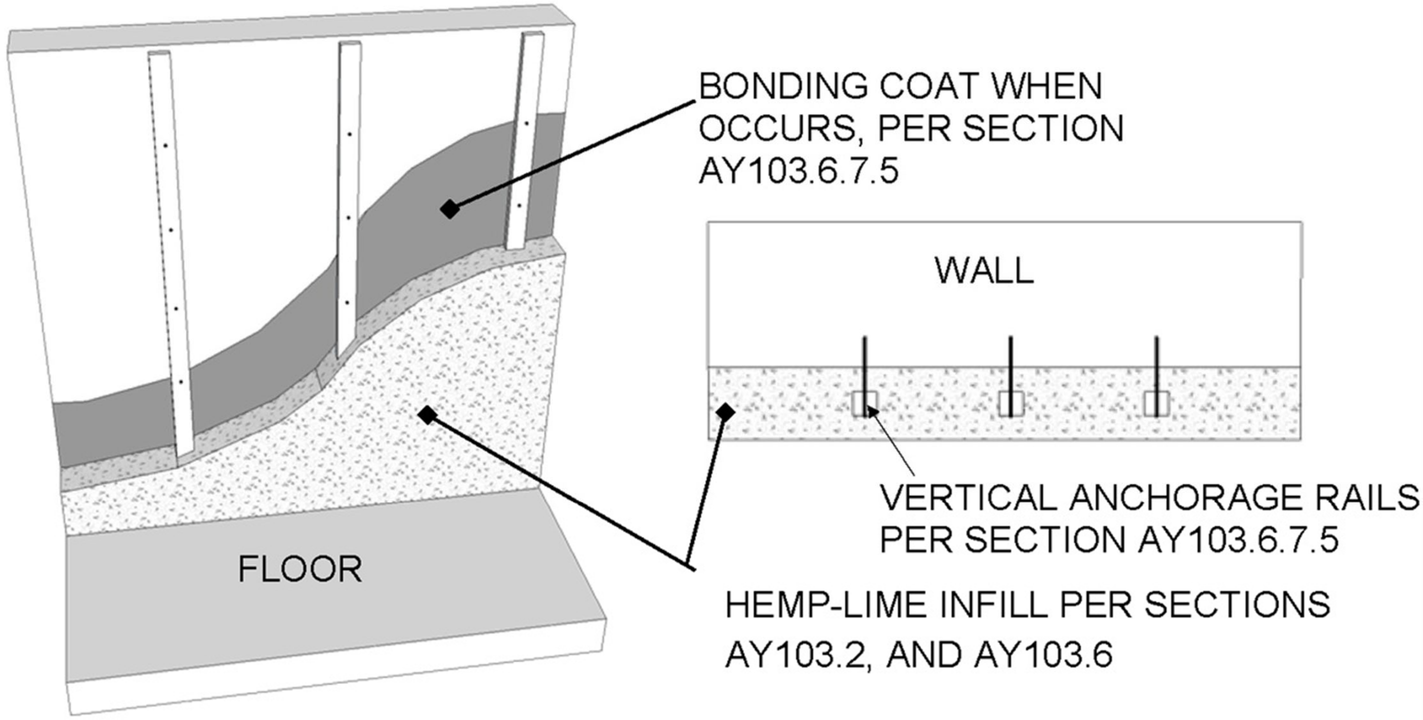


FIGURE AY103.6.7.5 TYPICAL HEMP-LIME THICK LINING

AY103.6.7.6 Minimum thickness at anchorage rails. The minimum thickness of hemp-lime between the exterior face of vertical anchorage rails and finished face of hemp-lime shall be 3 inches (76 mm) or in accordance with the *binder* manufacturer's specifications.

AY103.7 Moisture Control. Hemp-lime assemblies shall be protected from water intrusion and damage in accordance with Section AY103.7.1 through AY103.7.9.

AY103.7.1 Water-resistive barriers. *Water-resistive barriers* are prohibited on hemp-lime walls, except as permitted or required elsewhere in this appendix.

AY103.7.2 Vapor retarders. Vapor retarders are prohibited on hemp-lime walls, except as permitted or required elsewhere in this appendix.

AY103.7.3 Penetrations in hemp-lime walls. Penetrations in exterior hemp-lime walls shall be sealed with an*approved* sealant or gasket on the exterior side of the wall in all climate zones, and on the interior side of the wall in Climate Zones 5, 6, 7, 8 and Marine 4, as defined in Chapter 11.

AY103.7.4 Horizontal surfaces. Hemp-lime walls and other hemp-lime assemblies shall be provided with a*water-resistive barrier* at weather-exposed horizontal surfaces. The *water-resistive barrier* shall be of a material and installation that will prevent water from entering the wall system. Horizontal surfaces shall include exterior window sills, and sills at exterior niches. Horizontal surfaces shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain away from hemp-lime walls and other assemblies. Where the *water-resistive barrier* is below the finish material, it shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain to the exterior surface of the hemp-lime wall's vertical finish.

AY103.7.5 Air barrier. Exterior hemp-lime walls shall have a *vapor permeable air barrier* on all exterior and interior surfaces, except as permitted or required elsewhere in this appendix. Plaster in accordance with Section AY104.3 shall be acceptable as an *air barrier*.

AY103.7.6 Separation of hemp-lime and earth or paved areas. Hemp-lime shall be not less than 8 inches (203 mm) above exposed earth or paved areas.

AY103.7.7 Separation of exterior plaster and earth or paved areas. Exterior *plaster* applied to hemp-lime shall be not less than 8 inches (203 mm) above exposed earth or paved areas.

AY103.7.8 Separation of hemp-lime and exterior plaster from foundation. Hemp-lime and exterior *plaster* shall be separated from the foundation with an *approved* moisture barrier.

AY103.7.9 Base of wall flashing. Outer face of exterior walls shall be flashed to prevent water intrusion at the base of the wall.

SECTION AY104 FINISHES

AY104.1 General. The interior and exterior surfaces of hemp-lime walls shall be protected with a finish in accordance with Section AY104. Finishes shall have a vapor permeance rating of 5 perms or greater tested in accordance with Procedure B of ASTM E96.

AY104.2 Moisture content prior to application of finish. Hemp-lime *infill* shall have an average moisture content of no more than 20 percent at a depth of 1½ inches (38 mm), as measured from the face of the wall to which the finish will be applied for each wall. Moisture content shall be measured with a probe style wood moisture equivalent (WME) meter.

AY104.3 Plaster Finish. Exterior *plaster* shall be *lime plaster*, *clay plaster* in accordance with Section AY104.3.6.3, or other *approved plaster*. Interior *plasters* shall be any *plaster* permitted in Sections AY104.3.1 through AY104.3.9. *Plasters* shall be permitted to be applied directly to the surface of the hemp-lime *infill* without reinforcement, except that the juncture of dissimilar substrates shall be in accordance with Section AY104.5. *Plasters* shall have a thickness of not less than ½ inch (13 mm) on the interior and ¾ inch (19 mm) on the exterior, and shall be installed in not less than two coats, or per binder manufacturer's instructions. Not less than ⅜ inch (10 mm) exterior *plaster* is permitted behind exterior cladding in accordance with Section AY104.6.

AY104.3.1 Membranes. Membranes are prohibited between *plaster* and hemp-lime except where a membrane is allowed or required elsewhere in this appendix.

AY104.3.2 Lath and mesh for plaster. The surface of the hemp-lime functions as lath, and other lath or mesh shall not be required, except as required in Section AY104.5.

AY104.3.3 Plaster additives. Additives shall be permitted to increase *plaster* workability, durability, strength or water resistance. Additives shall not reduce the *plaster* vapor permeance rating to less than 5 perms. Additives containing polymers are prohibited.

AY104.3.4 Plaster reinforcing fibers. Reinforcing fibers shall be permitted in plaster. Acceptable reinforcing fibers include hemp fiber, chopped straw, sisal, animal hair and fiberglass.

AY104.3.5 Lime plaster. *Lime* plaster is any plaster with a *binder* primarily composed of calcium hydroxide ($Ca(OH)_2$) including Type N or S hydrated *lime*, hydraulic *lime*, natural hydraulic *lime* or slaked quicklime. Hydrated *lime* shall comply with ASTM C206. Hydraulic *lime* shall comply with ASTM C1707. Natural hydraulic *lime* shall comply with ASTM C141 and CEN EN 459. Quicklime shall comply with ASTM C5. *Lime* plaster shall contain sufficient *lime* to fully bind the sand or other aggregate, and shall be permitted to contain pozzolans.

AY104.3.6 Clay plaster. *Clay* plaster shall be any plaster having a *clay* or *clay subsoil binder*. Such plaster shall contain sufficient *clay* to fully bind the sand or other aggregate.

AY104.3.6.1 Clay subsoil requirements. The suitability of *clay subsoil* shall be determined in accordance with the Figure 2 Ribbon Test and the Figure 3 Ball Test in the appendix of ASTM E2392/E2392M.

AY104.3.6.2 Thickness and coats. *Clay* plaster shall be not less than ¾ inch (19 mm) thick, and shall be applied in not less than two coats.

AY104.3.6.3 Rain-exposed. *Clay* plaster, where exposed to rain, shall be finished with an *approved* erosion-resistant finish.

AY104.3.6.4 Prohibited finish coat. Plaster containing Portland cement shall not be permitted as a finish coat over *clay* plasters.

AY104.3.7 Clay-lime plaster. Clay-lime plaster shall be composed of refined *clay* or *clay subsoil*, sand, and *lime*.

AY104.3.8 Hemp-lime plaster. Hemp-lime plaster shall be composed of *hemp hurd* and *lime*, and shall be permitted to contain sand or other aggregate, and *pozzolans*.

AY104.3.9 Hemp-clay plaster. Hemp-clay plaster shall be composed of *hemp hurd* and *clay* or *clay subsoil*, and shall be permitted to contain sand or other aggregate.

AY104.4 Separation of wood and plaster. Wood framing at the exterior surface of hemp-lime walls shall be separated from exterior plaster with Grade D paper or other approved material, except where the wood is naturally durable.

Exception: Exterior *clay* plaster shall not be required to be separated from wood.

AY104.5 Bridging across dissimilar substrates. Bridging shall be installed onto and across dissimilar substrates prior to the application of plaster on the interior or exterior. Acceptable bridging materials include expanded metal lath, woven wire mesh, welded wire mesh, fiberglass mesh, *reed mat*, burlap, or other *approved* material. Bridging shall extend not less than 3 inches (76 mm), on both sides of the juncture.

AY104.5.1 Returns on recessed openings. Plaster or other exterior finish returns at recessed windows and doors shall require an *approved* design that prevents the intrusion of moisture.

AY104.6 Non-plaster exterior cladding. Non-plaster exterior *cladding* shall be spaced not less than 1 inch (25 mm) from the face of the *water-resistive barrier* or *air barrier* to the back of the cladding to allow for ventilation. The ventilation space shall be open at the top and bottom and be provided with insect screening.

AY104.6.1 Water-resistive and air barriers. *Water-resistive barriers* and *air barriers*, when *vapor permeable*, are permitted to be applied directly to the hemp-lime when exterior *cladding* is installed in accordance with Section AY104.6.

AY104.7 High moisture interior environments. Exterior hemp-lime walls enclosing showers or steam rooms shall be lined on the interior side with ceramic tiles on an *approved* tile backer board, ceramic tiles on a *lime* plaster, or a *tadelakt* finish.

SECTION AY105
FIRE RESISTANCE

AY105.1 Fire-resistance rating. Hemp-lime walls do not have a fire-resistance rating. Fire-resistance ratings for hemp-lime wall assemblies shall be determined in accordance with the required testing in Section R302.9.3.

AY105.2 Clearance to fireplaces and chimneys. Hemp-lime surfaces adjacent to fireplaces or chimneys shall be finished with not less than ⅜ inch (10 mm) thick plaster of any type permitted by this appendix. Clearance from the face of such plaster to fireplaces and chimneys shall be maintained as required from fireplaces and chimneys to combustibles in Chapter 10, or as required by manufacturer's instructions, whichever is more restrictive.

SECTION AY106
THERMAL PERFORMANCE

AY106.1 Mass Walls. Walls with hemp-lime infill shall be classified as mass walls in accordance with Section N1102.2.5 (R402.2.5) and shall meet the R-value requirements for mass walls in Table N1102.1.3 (R402.1.2), when their heat capacity (C) is greater than or equal to 6 Btu/ft^2× °F (123 kJ/m^2× K) in Equation AY-1.

$C = \rho \times t \times 0.299$ Btu/lb× °F **(Equation AY-1)**

where:

C = Heat capacity (Btu/ft^2× °F).

ρ = Density of hemp-lime infill (pounds per cubic foot).

t = Thickness of hemp-lime infill (in feet).

AY106.2 Thermal resistance. Hemp-lime has the unit thermal resistance values in accordance with Table AY106.2. Alternatively, the unit R-value of hemp-lime shall be determined with one of the following tests by an approved laboratory: ASTM C518, ASTM C1363, ASTM C177, or ASTM C1114. Test results from a specific hemp-lime mix shall be permitted to be used for multiple projects.

Table AY106.2 Thermal Resistance of Hemp-Lime[a]

Density (pounds per cu.ft.)	R-value (ft^2·°F·h/BTU per inch of thickness)
12.5	R-2.10
15	R-1.86
20	R-1.54
25	R-1.20

a. Linear interpolation is permitted. Extrapolation is not permitted.

AY106.3 Density measurement. Hemp-lime density shall be measured based on *approved* test samples as follows:

1. Three samples of the proposed hemp-lime mix shall be placed moist to completely fill a 6-inch by 6-inch by 12-inch (152 mm by 152 mm by 305 mm) form, a 6 inch (152mm) diameter x 12 inch (305 mm) length form or other *approved* form, following the application method and procedure that will be used during construction.
2. Samples shall be removed from the forms within 24 hours after hemp-lime placement or per the *binder* manufacturer's specifications.
3. Samples shall be cured/dried for a minimum of 14 days in indoor ambient conditions before density determination.
4. Density shall be determined by Equation AY-2.

$\rho = w / V$ **(Equation AY-2)**

where:

ρ = Density of hemp-lime infill (pounds per cubic foot).

w = Weight of hemp-lime infill sample (pounds).

V = Volume of hemp-lime sample (in cubic feet).

AY106.4 Compliance with Section R302.10.1. Hemp-lime *infill* meet the requirements for insulation materials in Section R302.10.1 for flame spread index and smoke-developed index as tested in accordance with ASTM E84.

SECTION AY107
MECHANICAL PERFORMANCE

AY107.1 Hemp-lime infill integrity. The integrity of hemp-lime *infill* and its ability to hold a plaster finish shall be demonstrated with a minimum compressive strength of 29 psi (0.2 MPa). Test results from a specific hemp-lime mix shall be permitted to be used for multiple projects.

AY107.1.1 Demonstration of compressive strength. The compressive strength of the hemp-lime mix shall be demonstrated to the building official before the placement of hemp-lime infill, with compressive strength tests and an associated report by an *approved* laboratory tested as follows:

1. Three samples of the proposed hemp-lime mix shall be placed moist to completely fill a 6-inch by 6-inch by 12-inch (152 mm by 152 mm by 305 mm) form, a 6 inch (152mm) diameter x 12 inch (305 mm) length form, or other *approved* form, following the application method and procedure that will be used during construction.
2. Samples shall be removed from the forms within 24 hours after hemp-lime placement or per the*binder* manufacturer's specifications.
3. Samples shall be cured/dried for a minimum of 14 days in indoor ambient conditions before testing.
4. The opposite faces shall be capped with plaster of paris to achieve smooth and parallel faces, after which the sample shall reach ambient moisture conditions before testing.
5. The horizontal cross section of the dried sample as tested, and the maximum applied load at failure shall be used to calculate the sample's compressive strength.
6. The average value of the samples shall be used to determine the mix's compressive strength.

SECTION AY108
REFERENCED STANDARDS

AY108.1 General. See Table AY108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

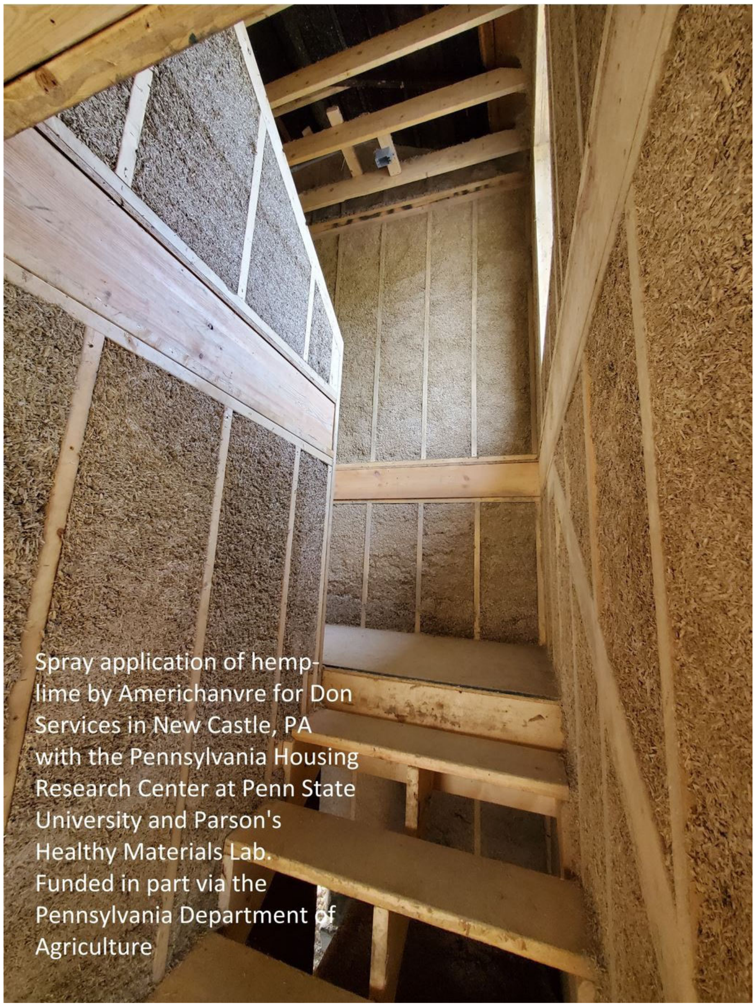
TABLE AY108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E96-00	*Standard Test Methods for Water Vapor Transmission of Materials*	AY104.1
ASTM C5-10	*Standard Specification for Quicklime for Structural Purposes*	AY104.3.5
ASTM C141/C141M-14	*Standard Specification for Hydrated Hydraulic LIme for Structural Purposes*	AY104.3.5
ASTM C206-14	*Standard Specification for Finishing Hydrated Lime*	AY104.3.5
ASTM C1707-11	*Standard Specification for Pozzolanic Hydraulic LIme for Structural Purposes*	AY104.3.5
ASTM E2392/ ASTM E2392M-10	*Standard Guide for Design of Earth Wall Building Systems*	AY104.3.6.1
CEN EN 459-2015	*Part 1: Building LIme. Definitions, Specifications and Conformity Criteria; Part 2: Test Methods*	AY104.3.5
ASTM C518-21	*Transmission Properties by Means of the Heat Flow Meter Apparatus*	AY106.2
ASTM C1363-19	*Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus*	AY106.2
ASTM C177-19	*Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus*	AY106.2
ASTM C1114-06(2019)	*Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus*	AY106.2
ASTM E84-21a	*Standard Test Method for Surface Burning Characteristics of Building Materials*	AY106.4

Reason: Hemp-lime, commonly referred to as hempcrete, is a non-structural, bio-composite insulation infill material composed of hemp hurd and a lime-based binder. Hemp-lime originated in the mid-1980s in France as a method for renovating historic buildings that required the addition of insulation with sufficient vapor permeability to preserve the structure's integrity. Since then, hemp-lime has been utilized and studied around the world, with its viability demonstrated in thousands of single-family homes, multi-family housing and commercial buildings. The benefits of hemp-lime include high thermal performance, low embodied carbon emissions in production, high carbon sequestration in service, healthy living environments, and high fire-resistance. These benefits, along with the 2018 U.S. legalization of hemp as a commercial crop, are driving rapid growth in interest and projects across the U.S. Hemp-lime provisions in the building code are greatly needed to remove obstacles to its safe and proper use.

Coastal Compound photo courtesy of Tim Callhan

Triangle Housing Project source image



New Castle stairs photo courtesy of Cameron McIntosh

Examples of hemp-lime homes have existed in the U.S. for over a decade, but not until industrial hemp became legal to grow via the Agricultural Improvement Act of 2018 was there the potential for a U.S. hemp-lime industry. This emerging industry requires the development and availability of regulations in order to expand in a safe and controlled manner. The proposed Hemp-lime (Hempcrete) Construction appendix for the IRC is an important step in this process. This document has been reviewed and has received input from over 25 hemp-lime design and building professionals in the US and around the world, as well as experts in ICC code development.

Hemp-lime modulates interior temperature and humidity, creating a comfortable living environment with its low thermal conductivity, thermal mass, and dynamic hygrothermal effects. Hemp-lime's excellent thermal performance reduces energy use, lowering utility bills while broadly benefiting the environment.

Current construction methods often rely on vapor-closed building envelopes that can promote mold and mildew growth, which reduces interior air quality. Hemp-lime offers a non-toxic insulation option that resists or prevents mold growth. Hemp-lime buildings allow the free passage of water vapor through the exterior walls without creating a point where it becomes trapped to condense. As the binder for hemp-lime is composed primarily of lime, the entire wall system resists mold and mildew growth due to the alkalinity of the lime. This is a major benefit to occupants sensitive to such toxins, as well as others who want to minimize their exposure to mold.

Hemp-lime walls provide a high level of fire resistance because the lime encapsulates the hemp in the matrix. Hemp-lime does not emit smoke or ignite when exposed to direct flame, as demonstrated by European fire tests and an ASTM E84 test where hemp-lime recorded the lowest possible index for flame spread and smoke development.

Though this proposal does not seek a fire-resistance rating, the U.S. hemp industry is planning to conduct an ASTM E119 test to establish a rating for hemp-lime wall assemblies.

The U.S. government has made lowering its carbon footprint a priority as it tries to meet its global environmental commitments. The building industry accounts for up to 40% of the world's carbon footprint, including both the embodied carbon of materials and the operational impact of buildings. Hemp-lime construction can have an enormous impact with its negative embodied carbon and its high thermal performance that reduces energy use. Industrial-scale hemp crops absorb significant quantities of carbon from the atmosphere, and when used in hemp-lime, its carbon is sequestered for the life of the building. Hydrated lime in the binder also absorbs carbon dioxide as it cures. This presents a major reversal in impact compared with some carbon intensive materials currently used in the building industry.

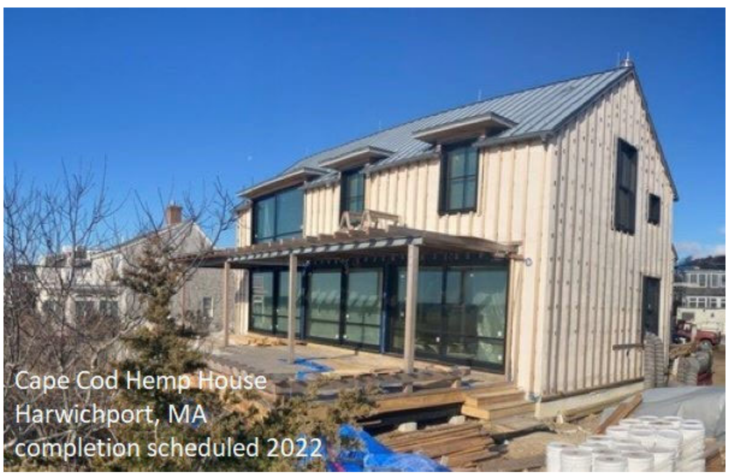
Supporting documents for the proposed Hemp-lime (Hempcrete) Construction appendix are available at:

https://ushba.org/icc-supporting-documents/

Appeldorn photo courtesy of Tim Callahan

Cape Cod Hemp House photo courtesy of Mpactful Ventures, PBLLC=

Hand Casting photo courtesy of Graham Durrant



CCHH photo courtesy of Mpactful Ventures

Rationale for Specific Sections of Proposed Appendix Y - Hemp-Lime (Hempcrete) Construction

SECTION AY101 - GENERAL:

Hemp-lime is limited to use as a nonbearing, wall infill material. It primarily functions as insulation and a substrate for finish. Until further seismic testing is done, hemp-lime construction is restricted to use in Seismic Design Categories (SDCs) A, B, and C, except with an approved engineered design. Engineering analysis based on structural and materials tests and accepted engineering practice have determined hemp-lime's safe prescriptive use in SDCs A, B, and C, within the limits of the IRC's structural provisions and this appendix. Testing reports, structural analysis, and other supporting documents are available at: https://ushba.org/icc-supporting-documents/

SECTION AY102 - DEFINITIONS:

Hemp-lime specific terms not found in the IRC are defined. Some definitions are consistent with identical or related terms defined in IRC appendices AR – Light Straw-Clay Construction, AS - Strawbale Construction, and AU - Cob Construction.

SECTION AY103 - HEMP-LIME CONSTRUCTION:

Hemp-lime as a non-structural infill must comply with the Figures in Section AY103 or an approved alternative. The four Figures show different locations of the structural stud wall framing; interior, center, exterior, or double (interior and exterior). These Figures indicate the

IRC sections that the foundation, wall framing, floor, and roof/ceiling assembly must comply with, unless otherwise stated in the appendix. They also identify code sections for other elements of a hemp-lime wall. Hemp-lime infill is limited to densities within a range of 12.5 to 25 pcf. This range encompasses the practical and commonly used hemp-lime densities.

The description and requirements of hemp-lime materials in this appendix are based on ASTM standards currently under development, and on input from hemp-lime building professionals and researchers. The binder is restricted to lime based binders because of their well established performance. Most importantly, all materials used in hemp-lime projects must match the materials used in the approved density and integrity test samples required in Sections AY106.3 and AY107.1.

Section AY103.3 contains provisions related to structure. General limits and requirements are given for all hemp-lime buildings, including: 1) maximum one story; 2) maximum building height of 25 feet; 3) braced wall panel lengths, and 4) maximum unit wall weight. Bracing is restricted to the IRC's Method LIB due to the low vapor permeability of braced wall panel sheathing options in the IRC. Structural metal, and all metal in contact with hemp-lime, must be stainless steel or coated to prevent corrosion. Door and window openings are addressed, including the support of hemp-lime by headers with required adjustments. Anchorage rails must be fastened to studs for interior or exterior wall designs, to anchor the hemp-lime to resist out-of-plane forces. Anchorage rails are not required for center and double wall designs, because those stud locations provide sufficient out-of-plane resistance by containment (double wall) or anchoring the hemp-lime in both directions (center wall).

The required minimum spacing between studs is to allow sufficient space to insert the hemp-lime. The required minimum thickness of hemp-lime is to ensure a cohesive infill. Window and door openings must be designed and constructed to prevent water intrusion.

Hemp-lime infill can be installed by hand casting or spray applying on site, or by precasting blocks or panels. Mixing of the material must allow the binder to coat the hemp hurd and to hydrate. Formwork must be vapor permeable or removed within 24 hours to allow the hemp-lime to dry. Hand cast hemp-lime infill must be installed in lifts of no more than 4" to allow a uniform density consistent with approved samples. Spray applied hemp-lime must be installed per the manufacturer's directions for the spray equipment.

Precast blocks and panels are a developing market with great potential. They can be cast by hand, spray equipment, or mechanical means, and can provide highly consistent materials that can be installed ready to be finished. Lined applications provide an easy way to use hemp-lime infill to increase the performance of existing homes. Lined applications must not be used in areas with high moisture content. The appropriateness of hemp-lime lined applications must be evaluated and designed by a registered design professional before use below grade.

Though lime is excellent at inhibiting mold growth and preserving the hemp and wood framing, hemp-lime requires vapor permeable finishes and protection from water intrusion. Water-resistive barriers and vapor retarders are generally prohibited because they interfere with the required vapor permeability and the mechanical bond of plaster. They are allowed only where necessary to prevent water intrusion, for example at horizontal surfaces such as window sills. Interior and exterior air barriers, typically plaster, are essential for optimal thermal performance of hemp-lime walls and to satisfy IRC Section N11024.1.1. Adequate distance between hemp-lime infill and its plaster and the exterior grade is required to protect against water intrusion.

SECTION AY104 - FINISHES:

Hemp-lime infill requires vapor permeable finishes on the interior and exterior of the wall. The finish is necessary to create an air barrier and the high vapor permeability is required to allow vapor to move through the wall. As with many other building materials, hemp-lime infill must be sufficiently dry before finishes are applied.

Hemp-lime is most commonly finished with plaster. Plaster is best applied directly to the hemp-lime infill.

Membranes must not be applied between the hemp-lime infill and plaster to ensure adequate vapor permeability and a mechanical bond for plaster. Other lath or mesh is not required. Plaster additives are allowed if they do not reduce vapor permeability below the required minimum of 5 perms (the IRC definition of vapor permeable). Reinforcing fibers are allowed to strengthen the plaster. Lime plaster is the most common plaster used on hemp-lime, because of its high vapor permeability and compatibility with the hemp-lime substrate. Clay plaster, with its even higher vapor permeability, is also acceptable for hemp-lime. Exterior clay plaster must be protected with a more durable material. Clay-lime and hemp-lime plasters have also been successfully used on hemp-lime.

When wood members are on the surface of the wall where plaster is to be applied, it is necessary to cover the wood with a water-resistive barrier unless the wood is otherwise protected from water. Exterior clay plaster can be in direct contact with wood, because clay's hygroscopic properties protect wood from moisture damage.

Where plaster is to be applied to hemp-lime adjacent to another material, a bridging material is required to reinforce the plaster. The bridging material strengthens the plaster, improves bonding, and prevents cracking. Recessed window and door openings in hemp-lime infill must be designed to prevent water intrusion.

Non-plaster exterior cladding can be used over hemp-lime infill. The hemp-lime must be covered with a vapor permeable air barrier such as lime plaster, and an air gap must be provided between the hemp-lime wall and the exterior cladding that is vented to allow air movement. The exterior cladding can have a water-resistive barrier behind it.

In high moisture conditions, such as showers or steam rooms, a water-resistant finish must be applied on the interior side of exterior hemp-lime walls.

SECTION AY105 - FIRE RESISTANCE:

Hemp-lime is known for its fire-resistive properties through tests in Europe. When structural members are surrounded by hemp-lime infill, it can protect them from fire. However because ASTM E119 or UL263 tests have not yet been performed, a fire-resistance rating is not included in this proposal.

SECTION AY106 - THERMAL PERFORMANCE:

Hemp-lime walls provide well-balanced thermal performance, with a combination of low thermal conductivity, thermal mass, and hygrothermal effects. Hemp-lime walls in this appendix are classified as mass walls per Section N1102.2.5, if their heat capacity is greater than 6 Btu/ft2 x°F. An Equation is given to calculate a mix's heat capacity.Hemp-lime infill's density is a determining factor of its R-value. The lower the density, the higher the R-value per inch. The relationship of density to unit R-value in Table AY106.2 was determined from a thorough review of research and testing.

In order to determine the density of the hemp-lime infill, samples are made from the materials to be used to construct the hemp-lime infill and tested following a specified procedure representative of the planned installation method.A hemp-lime ASTM E84 test conducted in 2020 yielded the lowest possible values, thus easily meeting the IRC requirements in R302.10.1 for flame spread index and smoke-developed index for insulating materials in wall assemblies.

SECTION AY107 - MECHANICAL PERFORMANCE:

Though hemp-lime infill is not structural, it must be capable of bearing its own weight and maintaining its integrity for the lifetime of the wall. To determine the integrity of the hemp-lime infill, a compression test must be performed on a representative sample made with the materials to be used to construct the hemp-lime infill, created using a procedure representative of the planned installation method.

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Magwood, Chris (2016) Essential Hempcrete Construction: The Complete Step-by-Step Guide, New Society Publishers

Sparrow, Alex and William Stanwix (2014) The Hempcrete Book: Designing and Building with Hemp-Lime, Green Books

Tradical (2018) Tradical Hempcretes [Brochure] https://www.bcb-tradical.com/wp-content/uploads/2018/02/Tradical-Hempcrete-brochure.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As a wall system, hemp-lime construction can be more costly or less costly than conventional wall systems in the IRC, depending on many variables. Hemp is inexpensive, some lime binders are of modest expense while some proprietary lime binders are expensive. Installing hemp-lime is labor intensive, but in one installation it provides insulation, thermal mass, and a substrate for finish.

Clay plasters use the inexpensive materials of clay subsoil (often from the site) and sand. The lime binder in lime plasters is more costly than clay subsoil, as well as the Portland cement binder used in conventional cement plaster. Clay, lime, and cement plasters all require a similar amount of labor. However unlike cement plaster over wood-frame walls, clay and lime plasters applied to hemp-lime infill do not require wire lath or a water-resistive barrier.

Other elements or systems in a hemp-lime building such as the foundation, roof/ceiling, electrical, plumbing and mechanical are typically similar to those used in conventional construction and therefore of similar cost.

On average, this proposal will not affect the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: APPENDIX AY HEMP-LIME (HEMPCRETE) CONSTRUCTION
AY101.1Scope. This appendix shall govern the use of hemp-lime as a non-structural ~~nonbearing~~ building material~~,~~ and wall infill system. *Townhouses* in *Seismic Design Categories* C, D_0, D_1 and D_2~~A, B, and C~~, and *one- and two-family dwellings* in *Seismic Design Categories* D_0, D_1, and D_2 shall require ~~with~~ an *approved* engineered design by a *registered design professional* in accordance with Section R301.1.3.

AY105.1 Fire-resistance rating. Hemp-lime walls do not have a fire-resistance rating. Fire-resistance ratings for hemp-lime wall assemblies shall be determined by testing in accordance with ASTM E119 or UL 263. ~~the required testing in Section R302.9.3~~.

Committee Reason: The proposal for a new appendix for Hemp-lime Construction was approved as modified. The committee considered that this is another technology similar to that of the straw bale and the cob wall construction. The industry will be able to provide safer building with uniform requirements being codified as an appendix as opposed to being an alternate method. This will make it easier for building departments to review plans for permitting this option. This provides prescriptive guidance for a sustainable option for wall infill. There were questions about if the the additional costs for forms remaining in place and the electrical systems being in conduit were included in the cost estimates. The proponents responded that it was included. The increased performance should balance the increase in cost if the building owner wants to use this option.

The modification to the title is to add the parenthetical option to the appendix title clarifies the scope of the appendix. The modification to Section AY101.1 adjusts the seismic design options without engineering to A, B and C for single family and two family dwellings and A and B for townhouses, so this will address concerns with the heavy weight of the walls. The modification to Section AY105.1 provides a specific reference to ASTM E 119 and UL 263 in lieu of the section that was referenced before.(Vote 7-2)

Final Hearing Results

RB316-22 AM

RM4-21

Original Proposal

IRC: M1402.1, M1403.1, M1412.1, M2006.1
Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

M1402.1 General. Oil-fired central furnaces shall ~~conform to~~ be *listed* and *labeled* in accordance with ~~ANSI /~~UL 727. Electric furnaces shall ~~conform to~~ be *listed* and *labeled* in accordance with UL 1995 or UL/CSA~~/ANCE~~ 60335-2-40.

M1403.1 Heat pumps. Electric heat pumps shall be *listed* and *labeled* in accordance with UL 1995 or UL/CSA~~/ANCE~~ 60335-2-40.

M1412.1 ~~Approval of~~ Listed equipment. Absorption systems shall be installed in accordance with the manufacturer's instructions. Absorption *equipment* shall ~~comply~~ be *listed* and *labeled* in accordance with UL 1995 or UL/CSA~~/ANCE~~ 60335-2-40.

M2006.1 General. Pool and spa heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired pool heaters shall ~~comply~~ be *listed* and *labeled* in accordance with UL 726. Electric pool and spa heaters shall~~comply be *listed* and *labeled* in accordance~~ with UL 1261. Pool and spa heat pump water heaters shall~~comply~~ be *listed* and *labeled* in accordance with UL 1995, or UL/CSA~~/ANCE~~ 60335-2-40 ~~or CSA C22.2 No. 236~~.

Exception: Portable residential spas and portable residential exercise spas shall~~comply~~ be *listed* and *labeled* in accordance with UL 1563 or CSA C22.2 No. 218.1.

Reason: This proposal clarifies that these various types of equipment shall be "listed and labeled", which are defined terms in the code, and is consistent with the style used in other sections of the code, such as M1403.1.
The first edition of the UL/CSA 60335-2-40 was jointly published with ANCE, but subsequent editions have not. The designation used for UL 727 should be shown without the prefix "ANSI/" for consistency with how all other UL standards are referenced in the I-codes.

CSA C22.2 No. 236 has been withdrawn due to the publication of UL/CSA 60335-2-40. The referenced standard of "C22.2 No. 218.1" in the exception for M2006.1 needs to be clearly identified as a CSA standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Clarifies the requirements and corrects the references of existing standards.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with the published reason statement. (11-0)

Final Hearing Results

RM4-21 AS

RM5-21

Original Proposal

IRC: SECTION M1404, M1404.1, UL Chapter 44 (New), UL Chapter 44

Proponents: Helen Walter-Terrinoni, AHRI, AHRI; Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin US (JBENGINEER@aol.com); Andrew Klein, A S Klein Engineering, The Chemours Company (andrew@asklein.com); Joe Nebbia, Newport Partners, Natural Resources Defense Council (jnebbia@newportpartnersllc.com)

2021 International Residential Code

SECTION M1404
REFRIGERATION COOLING EQUIPMENT

Revise as follows:

M1404.1 Compliance. Refrigeration cooling *equipment* shall comply with UL 474, UL 484, UL 1995, or UL/CSA 60335-2-40 ~~Section M1411~~.

Add new text as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 474-2015	Standard for Safety Dehumidifiers

Revise as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL/CSA~~/ANCE~~ 60335-2-40 ~~—2012~~ 2019	Standard for Household and Similar Electrical Appliances, Safety - Part 2-40: ~~Particular Requirements for Motor-compressors~~ Particular requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

Add new text as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 484-2019	Standard for Room Air Conditioners

Reason: This code change removes the reference to Section 1411 and adds the appropriate standards that regulate refrigeration cooling equipment. UL 484, UL 1995, and UL/CSA 60335-2-40 are the three standards that regulate all residential air conditioning and refrigerant cooling equipment. UL 474 and UL 484 is a new standard being introduced to the code. UL 474 regulates dehumidifiers. UL 484 regulates room air conditioners such as window units and package terminal air conditioners (PTACs). UL 474, UL 484, and UL 1995 will eventually sunset with UL/CSA 60335-2-40 as the replacement standard. However, these three standards are still being used for listing of equipment. Currently, Section M1403.1 references UL 1995 and UL/CSA/ANCE 60335-2-40 for heat pumps. Similarly, Section M1412.1 references these two standards for absorption cooling equipment. The modification will compliment these two sections and their corresponding references to the standards. In addition, a revision to the IMC added these standards to Table 1101.2. This will keep the IRC consistent with the IMC regarding appropriate standards referenced for refrigeration equipment.

UL/CSA 60335-2-40 has been updated to the current edition since a significant number of new safety requirements were added to the standard.While Section 1411 is removed from a reference, the section still applies. It is not necessary to reference the section.

(Joe Nebbia,)
The current language in the 2021 IRC in section M1404 does not contain needed reference to UL 484, UL 1995, or UL/CSA 60335-2-40, the appropriate safety standards that establish requirements for this equipment. Rather the section points to M1411 unnecessarily. M1411 applies to both heating and cooling equipment regardless of the current statement in M1404. This code change replaces the unnecessary reference to M1411, without removing the requirements of M1411, while adding the necessary reference to equipment safety standards. This change is consistent with how other sections in Chapter 14 (M1402, M1403, M1412, M1413) reference equipment safety standards and mirrors the structure of M1403 (Heat Pump Equipment). It also allows the reference to the most up to date UL/CSA 60335-2-40 which includes safety requirements specific to A2L refrigerants.

These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan.

These restrictions on the supply of HFC refrigerant will drive up consumption of A2L substitutes. Permitting use of alternative refrigerants, including A2L refrigerants, in high probability systems for human comfort will enable states and local jurisdictions to meet their heating and cooling needs while also complying with applicable HFC regulations. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This code change allows the ICC to provide an off the shelf solution to those jurisdictions.

Residential equipment represents a large portion of HFC emissions. Residential and light commercial air-conditioning make up 22% of nationwide refrigerant emissions,2 making this change an important piece to addressing the residential use of HFC refrigerants. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This change allows the ICC to provide an off the shelf solution to those jurisdictions.

1 https://www.nrdc.org/experts/christina-theodoridi/states-keep-steady-course-hfc-regulations2 https://www.epa.gov/sites/production/files/2015-09/documents/epa_hfc_residential_light_commercial_ac.pdfThe current language in the 2021 IRC in section M1404 does not contain needed reference to UL 484, UL 1995, or UL/CSA 60335-2-40, the appropriate safety standards that establish requirements for this equipment. Rather the section points to M1411 unnecessarily. M1411 applies to both heating and cooling equipment regardless of the current statement in M1404. This code change replaces the unnecessary reference to M1411, without removing the requirements of M1411, while adding the necessary reference to equipment safety standards. This change is consistent with how other sections in Chapter 14 (M1402, M1403, M1412, M1413) reference equipment safety standards and mirrors the structure of M1403 (Heat Pump Equipment). It also allows the reference to the most up to date UL/CSA 60335-2-40 which includes safety requirements specific to A2L refrigerants.

These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan.

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Bibliography: [1] https://www.nrdc.org/experts/christina-theodoridi/states-keep-steady-course-hfc-regulations
[2] https://www.epa.gov/sites/production/files/2015-09/documents/epa_hfc_residential_light_commercial_ac.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change only adds the appropriate standards that are used for testing and listing refrigeration cooling equipment. The code already requires such equipment to be listed.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

M1404.1 Compliance. Refrigeration cooling *equipment* shall ~~comply~~ be listed and labeled in accordance with ~~UL 474,~~ UL 484, UL 1995, or UL/CSA 60335-2-40.

~~UL 474-2015~~	~~Standard for Safety Dehumidifiers~~

Committee Reason: For the modification: The code should not reference a standard that has been withdrawn by the promulgator. The change of "comply," to, "listed and labeled in accordance with," make the text consistent with ICC code text format.For the proposal as modified: The proposed standards are necessary as they include the updated requirements for systems using A2L refrigerants. (11-0)

Final Hearing Results

RM5-21	AM

RM6-21

Original Proposal

IRC: M1411.1, M1411.2 (New), M1411.3 (New), M1411.4 (New), M1411.5 (New), M1411.6 (New), M1411.7 (New), ANCE Chapter 44, CSA Chapter 44, UL Chapter 44

Proponents: Helen Walter-Terrinoni, AHRI, AHRI (helen.a.walter-terrinoni@outlook.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin US (JBEngineer@aol.com)

2021 International Residential Code

M1411.1 Approved refrigerants. Refrigerants used in direct refrigerating systems shall conform to the applicable provisions of ANSI/ASHRAE 34.

Add new text as follows:

M1411.2 Refrigeration system listing. Refrigeration systems using Group A2L refrigerants shall be listed and labeled to UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40. Refrigeration systems using Group A1 refrigerants shall be listed to UL 60335-2-40/CAN/CSA C22.2 No. 6-335-2-40 or UL 1995/CSA C22.2 No. 236. The equipment shall be installed in accordance with the listing.

M1411.3 Refrigeration system installation. Refrigeration systems shall be installed in accordance with the manufacturer's installation instructions. After installation, the manufacturer's installation instructions, owner's manuals, service manuals, and any other product literature provided with the equipment shall be attached to the indoor unit or left with the homeowner.

M1411.4 Field installed accessories. All Field installed accessories shall be installed in accordance with the accessory and equipment manufacturer's installation instructions. Accessories installed in the ductwork of Group A2L refrigeration systems shall not contain electric heating elements, open flames, or devices switching electrical loads greater than 2.5 kVA.

M1411.5 Signs and identification. Each refrigeration system using Group A2L refrigerant shall have the following information legibly and permanently indicated on a markable label provided by the equipment manufacturer.

1. Contact information of the responsible company that installed the refrigeration system, and
2. The system refrigerant charge and the refrigerant number.

M1411.6 Refrigerant charge. All refrigeration systems shall have refrigerant charge in compliance with the equipment manufacturer's installation instructions and the requirements of the listing. Group A2L refrigerant charge for an individual refrigeration system shall not exceed 34.5 lbs (15.7 kg).

M1411.7 Group A2L refrigerant piping testing. The piping system containing Group A2L refrigerant shall be tested in accordance with the manufacturer's installation instructions and the requirements of the listing.

Delete without substitution:

ANCE

Association of Standardization and Certification
Av. Lázaro Cárdenas No. 869 Fraccion 3
Col. Nva. Industrial Vallejo Deleg. Gustavo A. Madero, México, D.F.

~~NMX-J-521/2-40-ANCE–2014/CAN/CSA-22.2 No. 60335-Safety of Household and Similar Electric Appliances, Part 2-40: Particular Requirements for Heat Pumps, Air-Conditioners and Dehumidifiers~~

~~2014/CAN/CSA-22.2 No. 60335~~

~~2-40–12/UL 60335-2-40~~

Revise as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

UL 60335-2-40-2019/CAN/CSA/C22.2 No. 60335-2-40~~–2012~~19	Standard for Safety of Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL~~/CSA/ANCE~~ 60335-2-40 ~~–2012~~2019/CAN/CSA C22.2 No. 60335-2-40-19	Standard for Safety Household and Similar Electrical Appliances~~,~~ - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers ~~Motor-compressors~~

Reason: ASHRAE has developed a new standard, ASHRAE 15.2, that addresses requirements for residential refrigeration systems and air conditioners. This proposed change adds requirements consistent with the provisions in ASHRAE 15.2. This code change was developed through the cooperation of ASHRAE SSPC 15 members, ASHRAE SPC 15.2 members, AHRI, and NAHB.
The general requirements list the specific standards that regulate refrigeration equipment. The change will mandate a listing to UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40 for any equipment using A2L refrigerant. The same standard will apply for systems using A1 refrigerants. Additionally UL 1995 is included for equipment using A1 refrigerants. UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40 has been updated to the 2019 edition which is the latest edition. In the latest edition, ANCE (from Mexico) withdrew their sponsorship. Hence, the ANCE listing is shown deleted. The standard is only bi-national between the United States and Canada.

The field marking of new equipment is required by the product standard. This requirement has been added to the code to keep the code consistent with the listing requirements.

The manufacturer specifies the charge limitation in the installation instructions for equipment using Group A2L refrigerant. This is also required by the product standard and assures the safe amount of charge based on room volume. The manufacturers also specify the testing requirements for refrigerant piping for residential equipment. Testing of the refrigerant piping is important to identify to allow the code official to observe that the piping can me the pressure requirements of the equipment.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The installation of air conditioning equipment is optional. Therefore there is no increase or decrease in cost. This change emphasizes the requirements currently in the code regarding general listing and installation of mechanical equipment.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The change provides a clear directive for the safe use of the new A2L refrigerants that are beginning to be used by appliance manufacturers. The development of these requirements through the cooperation of many stakeholders provides a solid basis for accepting appliances and systems using these refrigerants. (11-0)

Final Hearing Results

RM6-21 AS

RM8-21

Original Proposal

IRC: 1502.6 (New)

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

1502.6 Makeup air. Installations exhausting more than 200 cfm (0.09 3/s) shall be provided with make up air. Where a closet is designated for the installation of a clothes dryer, an opening having a area of not less than 100 sq. inches (0.o645 m2) for make up air shall be provided in the closet enclosure, or make up air shall be provided by other approved means.

Reason: This language does not appear in Section M1502 for dryer exhaust and is a logical location for the makeup air requirements for residential clothes dryers. This is the same language found in the IMC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
IRC-1502.6 .... This IMC extraction should not increase the cost of construction as no new materials are required to provide and opening in a wall. A louvered door is over and above what the code calls for but would be an option and not a requirement possibly increasing cost.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The language is inconsistent and confusing with the use of the term "makeup air", which is undefined in the IRC. It is not clear what is needed, make-up air or transfer air, for the appliance. The term "designated" should be changed to "intended" when referring to the closet's intended use for a dryer. (11-0)

Public Comments

Public Comment 1

Proponents: Joseph J. Summers, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

AIR, MAKEUP . Any combination of outdoor and transfer air intended to replace exhaust air and exfiltration.

AIR, OUTDOOR .
Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

AIR, TRANSFER . Air moved from one indoor space to another.

M1502.6 Makeup air . Installations exhausting more than 200 cfm (0.09 m^3/s) shall be provided with makeup air.

M1502.6.1 Closet Installation . Where a closet is designed for the installation of a clothes dryer, makeup air shall be provided in accordance with the dryer manufacturer's installation instructions. If the manufacturer installation instructions do not include specifications for provision of makeup air, one or more permanent openings having a total area of not less than 100 square inches (645 mm^2) shall be provided in the closet enclosure, or makeup air shall be provided by other approved means.

M1503.6 Makeup air required . Where one or more gas, liquid or solid fuel-burning *appliance* that is neither direct-vent nor uses a mechanical draft venting system is located within a dwelling unit's air barrier, each exhaust system capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall be mechanically or passively provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not fewer than one outdoor air duct and damper complying with Section M1503.6.2.

> **Exception:** Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.

M1503.6.1 Location . Kitchen exhaust makeup air that is ducted from the outdoors shall be discharged into the same room in which the exhaust system is located or into rooms or *duct systems* that communicate through one or more permanent openings with the room in which such exhaust system is located. Such permanent openings shall have a net cross-sectional area not less than the required area of the makeup air supply openings.

Commenter's Reason: This PC represents a consensus position between proponents and opponents of RM8 that addresses the committee's concerns while establishing minimum and reasonable requirements for clothes dryer makeup air. It was also reviewed and approved by the PMGCAC. The PC borrows from the makeup air requirements of Section 504.7 of the IMC and Section G2439.5 of the IRC Fuel Gas chapter, recognizes the primacy of manufacturer installation instructions (similar to how clothes dryer exhaust duct equivalent length is addressed in Section M1502.4.6.2), and introduces definitions of makeup air, transfer air, and outdoor air that are also copied from the IMC. In the case that manufacturer instructions do not provide specifications for the provision of makeup air, the text and accompanying definitions clarify that transfer air can be used to meet makeup air requirements for clothes dryers in closets or that makeup air could be directly ducted from the outdoors to the clothes dryer closet, at the builder's discretion.

To ensure that the cross-walked definitions are compatible with other makeup air requirements in the IRC, slight modifications have been made to the kitchen range hood makeup air section. These modifications clarify that, where required by M1503.6, a kitchen range hood makeup air system shall have at least one outdoor air duct to provide makeup air. This modification is made to preserve the intent of Section M1503.6 when introducing the definition of makeup air to the IRC.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
In most cases, this language should not increase the cost of construction as it permits transfer air to serve as makeup air for clothes dryers and recognizes manufacturer instructions as the primary path for determining makeup air requirements for clothes dryers.

Final Hearing Results

RM8-21	AMPC1

RM12-21

Original Proposal

IRC: M1504.3
Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Residential Code

Revise as follows:

M1504.3 Exhaust openings. Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where theeither of the following apply:
   3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.

   3.2 The exhaust opening is part of an approved factory-built intake/exhaust combination termination fitting installed in accordance with the manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

Reason: Intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of intake/exhaust combination terminations results in minimum cross-contamination of airflows(i.e., not exceeding 4%; see NRC report A1- 007793). These results are aligned with ASHRAE 62.2 approval of such devices, which limits cross-contamination to 10%, as verified by the manufacturer. If approved, this proposed modification to the IRC would limit application of intake/exhaust combination terminations to “approved”, “factory-built” units. Approval of this proposed modification is expected to result in more affordable and architecturally flexible terminations. Note: The IRC defines living space as, “space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes”.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). 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: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 7.

Bibliography: Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided. Additional reports are available from the proponent upon request.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1504.3 Exhaust openings . Air exhaust openings shall terminate as follows:

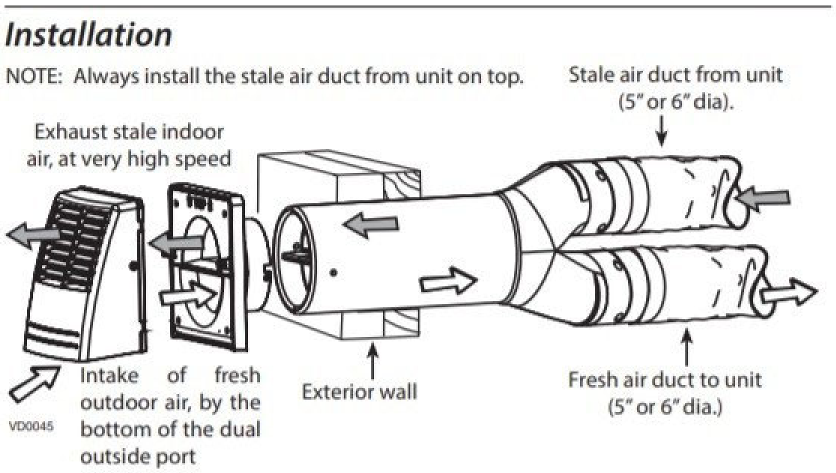
1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where the either of the following apply:
   3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.
   3.2 The exhaust opening is part of ~~an approved~~ a factory-built intake/exhaust combination termination fitting installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

Commenter's Reason: This comment modifies language approved by the IRC Mechanical committee to align with the IMC Committee's action on M16.
Factory-built intake/exhaust combination termination fittings are regularly provided by fan manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. The included image from a fan manufacturer's installation instructions provides an example of a typical fitting serving this purpose.

The IRC Mechanical committee's approval of RM12 as submitted aligned with the 2018 IMC's Sections 401.4 and 501.3.1 approval of the use of "*approved* factory-built intake/exhaust combination termination fittings" to separate the air streams associated with mechanical intake air openings and living space exhaust air, when the fitting is provided in accordance with the fan manufacturer's instructions. Similarly, Section G2407.1 of the Fuel Gas Code (see below for reference) approves the use of concentric vent termination fittings to separate combustion air from flue gases provided that such fittings are installed “in accordance with the appliance manufacturer’s instructions”; the primary difference between the 2018 IMC and the Fuel Gas Code in this respect is that the Fuel Gas Code does not require special approval for concentric vent termination fittings.

By approving M16 as submitted, the IMC Committee removed the requirement for factory-built intake/exhaust combination termination fittings to be "approved" when such terminations are installed in accordance with the "appliance" manufacturer's instructions (based on feedback received since the hearings, a PC will be submitted to M16 to change the word "appliance" to "fan" to better clarify that such terminations must be recognized by the fan manufacturer to be provided without special approval). This action aligned the 2024 IMC requirements for factory-built intake/exhaust combination termination fittings with the Fuel Gas Code's treatment of concentric vent termination fittings (i.e., no special approval is required when installed in accordance with the appliance/fan manufacturer's instructions). Approval of this public comment to RM12 and approval of M16 as modified with the PMGCAC's public comment will align the 2024 IRC, 2024 IMC, and 2024 FGC in this regard.

Fuel Gas Code reference: "G2407.1 (304.1) General ..... Direct-vent appliances, gas appliances of other than natural draft design, vented gas appliances not designated as Category I and appliances equipped with power burners, shall be provided with combustion, ventilation and dilution air in accordance with the appliance manufacturer's instructions."



Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
Removing requirements for special approval of factory-built intake/exhaust combination termination fittings can be expected to reduce labor costs
for builders, contractors, and code officials.

Final Hearing Results

RM12-21	AMPC1

RM13-21

Original Proposal

IRC: M1504.3

Proponents: Brent Ursenbach, West Coast Code Consultants, Inc, Utah Governor's Office of Energy Development (brentu@wc-3.com)

2021 International Residential Code

Revise as follows:

M1504.3 Exhaust openings. Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doorsexcept where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where the exhaust opening is located not less than 3 feet (914 mm) above the air intake opening. Openings shall comply with Sections R303.5.2 and R303.6.

Reason: With the increased popularity of townhouses, many times with limited wall areas on the front and back of these dwellings, quite often it's difficult to find sufficient wall area to locate terminations compliant with the exhaust opening 3' clearance requirements in this section. The exhaust from dryers, bath fans and domestic ranges is not considered noxious or hazardous, and poses little if any health risk. The following paragraph #3, allows a 70% reduction from 10' above to 3' above for mechanical air intakes. It's reasonable to allow a 66% reduce from 3' above to 1'' above for the gravity intakes, doors and operable windows in paragraph #2.

Imagine the simplification of the exhaust duct installations if terminations were allowed above windows, with this 1' clearance requirement.

In IRC Chapter 24 clearance requirements for direct vent gas appliance from these openings are in many cases less than these requirements for these environment exhausts. These gas vents exhaust hazardous productions of combustion to outside.

Meeting the current requirements often adds extra elbows and pipe to the exhaust duct system, reducing the airflow through the duct.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal reduces materials and labor expense required to offset exhaust duct terminations away from windows.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with most of the published reason statement but took exception with the phrase, "exhaust from dryers." (10-1)

Final Hearing Results

RM13-21 AS

RM14-21

Original Proposal

IRC: M1505.3

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1505.3 Exhaust equipment. Exhaust fans and whole-house mechanical ventilation fansshall be *listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 and HVI 916.

Reason: IRC Table N1103.6.1 (R403.6.1) requires exhaust fan airflow to be determined in accordance with HVI 916, which is a test procedure that references ANSI/AMCA 210-ANSI/ASHRAE 51. This change provides editorial clarification and consistency across sections of the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial; therefore, it will not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

M1505.3 Exhaust equipment. Exhaust fans and whole-house mechanical ventilation fans shall be*listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 ~~and~~ or HVI 916.

Committee Reason: For the modification: The modified language clarifies the purpose of the proposal by adding, "or," and removing, "and."
For the proposal as modified: It adds another way to test the equipment. (11-0)

Final Hearing Results

RM14-21	AM

RM16-21

Original Proposal

IRC: SECTION 202, M1505.4.3
Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Delete without substitution:

~~**[MP] BALANCED VENTILATION.** Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~

Revise as follows:

[MP] BALANCED VENTILATION SYSTEM. A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average~~s~~. The balanced ventilation system airflow is the average of themechanical supply and mechanical exhaust airflows.

M1505.4.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

$$\text{Ventilation rate in cubic feet per minute} = (0.01 \times \text{total square foot area of house}) + [7.5 \times (\text{number of bedrooms} + 1)]$$

(Equation 15-1)

Exceptions:

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:
   1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
      1.1.1. Living room.
      1.1.2. Dining room.
      1.1.3. Kitchen.
   1.2. The whole-house ventilation system is a *balanced ventilation system*.
2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1 or by Exception 1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

Reason: The 2021 versions of the IMC and IRC introduced a 30% ventilation rate credit for dwelling units with systems providing balanced ventilation. Because these changes were based on the approval of multiple proposals, their approval resulted in different definitions for *balanced ventilation* and *balanced ventilation system* across the IRC and IMC. This proposal and its companion proposal to the IMC are correlation proposals that will align the terminology, definitions, and their application across both codes. This proposal deletes the term "*balanced ventilation*", which is not used within the IRC, and modifies the term "*balanced ventilation system*" to incorporate the relevant components of "*balanced ventilation*". The proposed definition for "balanced ventilation system" is also proposed within the companion proposal to the IMC. The change that is proposed in Section M1505.4.3 exception 1.2 is italicizing the phrase "*balanced ventilation system*" so that the user is directed to the corresponding definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial and therefore will not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with the published reason statement. (11-0)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

[MP] BALANCED VENTILATION SYSTEM . ~~A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.~~
A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10% of the average of the two airflow rates.

Commenter's Reason: The PMGCAC worked with the proponent to revise the language in response to the IMC Committee's comments on M23, which is the coordinating proposal to align definitions across the IMC and IRC. All parties agree that this definition better clarifies the meaning of the current term. The PMGCAC and the proponent are submitting a coordinating public comment to revise the IMC definition under M23.

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 a non-substantive clarification of an existing definition.

Final Hearing Results

RM16-21	AMPC1

RM17-21

Original Proposal

IRC: M1506 (New), M1505.4.4, TABLE M1505.4.4, M1503.5

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Add new text as follows:

M1506
LOCAL EXHAUST RATES

Revise as follows:

~~M1505.4.4~~ M1506.1 ~~Local exhaust rates~~ General. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.4.4.~~ M1506.1.

TABLE ~~M1505.4.4~~ M1506.1 MINIMUM REQUIRED LOCAL EXHAUST RATES ~~FOR ONE- AND TWO-FAMILY DWELLINGS~~

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates. Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, ~~the fans shall be sized in accordance with Section M1505.4.4~~. the minimum exhaust rate shall be in accordance with Section M1506.1

Reason: 1) Local exhaust rates for kitchens and bathrooms should not be a subsection of whole house mechanical ventilation. This proposal creates a new subsection 305.5 "Local Exhaust Rates"

2) There is no reason to state "one and two-family dwellings" unless this is meant to not apply to dwelling units in a townhouse. Technically (by definition), a townhouse contains "dwelling units" and is not a "dwelling". There is no reason this would not also apply to dwelling units in townhouses.
3) The reference to the minimum kitchen exhaust rate should be about exhaust rates, not "sizing of fans".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
1) Striking out the term “for one- and two-family dwellings” will not change the cost of construction, because the provisions in the table are already applied to “dwelling units” in “townhouses” in industry standard practice. The IRC scope is only for one- and two-family dwellings and townhouses, and since the provisions in this table apply to all of those, there is no necessity to describe the building types in the table heading.

2) Moving Table M1506.1 into its own section does not change the application of the table and thus does not affect the cost of construction. It is simply a reorganization, as local exhaust rates are not directly associated with whole-house ventilation systems.

3) Changing the phrase “the fans” to “exhaust rate” used in Section M1503.5 to reference Table M1504.4 so that the object of the reference matches the title and purpose of the table (exhaust rate) will have no cost impact on construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

~~M1506.1~~ M1505.5 ~~General~~ Local exhaust rates. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1506.1~~ M1505.5

TABLE ~~M1506.1~~ M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates. Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, the exhaust rate shall equal or exceed the airflow required in Table M1505.5 at one or more speed settings.~~the minimum exhaust rate shall be in accordance with Section M1506.1~~

Committee Reason: For the modification: It clears up the language of the original proposal by applying the highest setting to the minimum requirement, which was the intent of the original proposal.
For the proposal as modified: It provides clarity for the minimum requirements. (7-4)

Public Comments

Public Comment 1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com); Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

~~M1506 LOCAL EXHAUST RATES~~ .

TABLE M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates . Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, the exhaust rate shall equal or exceed the airflow required in Table M1505.5 at one or more speed settings.

M1505.5 Local exhaust rates . *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.5.~~M1505.5 at one or more speed settings.

Commenter's Reason: Section 1506 has no text in it and should be stricken.
The text "mechanical exhaust capacity of" in Table M1505.5 is unnecessary because this table is located within the "Mechanical Ventilation" section, and it is understood that the local exhaust rates in Table M1505.5 are mechanical exhaust airflow rates. The text, "at one or more speed settings" should be included in M1505.5 to align with action that the committee took on M1503.5 and the intention that the minimum airflow rate required by Table M1505.5 be provided by at least one speed setting of the exhaust equipment. This text clarifies that single speed units can comply when the single speed provides an airflow rate no less than the relevant table value and that variable and multiple speed units can comply when at least one speed setting provides an airflow rate no less than the relevant table value.

This clarification is needed to ensure that popular bathroom exhaust fans with multiple speed settings (e.g., 30, 50, and 80 cfm) can be approved, and permits builders to order one SKU across multiple projects that can be customized as necessary to satisfy the targeted ventilation rate (e.g., Table M1505.5's 50 cfm intermittent or 20 cfm continuous). This modification also permits smart range hoods to comply with this section; smart range hoods can detect and respond to pollutant concentrations during cooking events by increasing airflows to 300-400 cfm on high speed as needed but can also throttle back to intermittent airflows of less than 100 cfm following a cooking event when lower airflows and quieter operation are desired to exhaust residual pollutant concentrations in the kitchen.

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 public comment clarify the current requirements of the code.

Final Hearing Results

RM17-21	AMPC1

RM18-21

Original Proposal

IRC: M1602.2

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Return air shall not be taken from a closet,~~bathroom,~~ toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:
   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
5. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
6. Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
7. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Return air from bathrooms is necessary to control bathroom moisture levels during cooling periods.
Increasing air change with the rest of the occupied space results in lower moisture levels in the bathroom and allows the air conditioning system to remove moisture. Relying on bathroom exhaust fans exhausting to the exterior to control bathroom moisture does not effectively reduce bathroom moisture levels. Exhaust ventilation in bathrooms should be used to control odors not moisture. Exhaust ventilation results in increasing air change in the entire occupied space and increasing moisture loads due to infiltration of exterior humid air throughout the occupied space. This higher air change rate (infiltration) supplies more moisture than the air conditioning system can remove. Odors are still controlled by bathroom exhaust fans exhausting air to the exterior. These bathroom exhaust fans do not have to operate continuously to control odors. Only providing supply air to bathrooms exacerbates the problem by making roof surfaces colder.

This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides another option to reduce moisture levels in houses and prevent mold issues.(7-4)

Final Hearing Results

RM18-21	AS

RM19-21

Original Proposal

IRC: M1602.2

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer’s installation instructions, Manual D or the design of the *registered design professional*.
4. <u>Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct.</u>
5. <u>Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).</u>

4 6. Return air shall not be taken from a~~closet,~~ bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
3. <u>Return air taken from closets shall serve only the closet and may shall be permitted to be taken from closets that have no dedicated supply duct.</u>

5 7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

6 8. Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

7 9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Mold growth is now common in closets due to higher interior moisture loads and less heat gain in closets. Allowing a limited amount of return air provides a means of controlling closet moisture levels. Providing supply air to a closet exacerbates the problem by making closet surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The supporting document indicated that ASHRAE needs to continue looking at the issue. The proposed language is confusing. (7-4)

Public Comments

Public Comment 1

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1602.2 Return air openings . Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. ~~Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct.~~
5. ~~Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).~~
4. Where return air is taken from a closet the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, shall not require a dedicated supply duct and the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).

5. ~~6.~~ Return air shall not be taken from a bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
   3. Return air taken from closets shall serve only the closet~~and may shall~~ and ~~may~~ shall be permitted to be taken from closets that have no dedicated supply duct.

6. ~~7.~~ For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
7. ~~8.~~ Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
8. ~~9.~~ Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Commenter's Reason: Modify the text to be less confusing and remove an unneeded restriction on the closet size.
The return openings are sized so as to not produce negative pressure in the closet.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Final Hearing Results

RM19-21	AMPC1

RM20-21

Original Proposal

IRC: M1602.2

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space. Return air taken from mechanical rooms shall serve only the mechanical room and shall be permitted to be taken from mechanical rooms that have no dedicated supply duct.
3. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Where return air is taken from a mechanical room with combustion appliances only sealed combustion appliances shall be permitted within the mechanical room.
5. Where return air is taken from a mechanical room the pressure differential across the mechanical room door shall be limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, or installing a louvered door or transfer grille, or by some other means.

~~4~~ 6. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, ~~mechanical room, boiler room, furnace room~~ or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

~~5~~ 7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

~~6~~ 8. Taking return air from an unconditioned *crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

~~7~~ 9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this*code change is not a requirement. It gives builders an option to solve and avoid problems.*

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposed language is confusing. For example, the statement about return air taken from the mechanical room shall serve only the mechanical room. There is a contradiction in Item 5. The Committee agreed with the intent of the proposal but the language needs more work. The Committee would like to see this brought back in public comment. (8-3)

Public Comments

Public Comment 1

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1602.2 Return air openings . Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or~~space~~ space except mechanical rooms, boiler rooms or furnace rooms shall be not greater than the flow rate of supply air delivered to such room or space. Return air taken from mechanical rooms, boiler rooms or furnace roomsshall serve only the mechanical room and shall be permitted to be taken from mechanical rooms that have no dedicated supply duct.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Where return air is taken from a mechanical room, boiler room or furnace room with combustion appliances only sealed combustion appliances shall be permitted within the mechanical room.
5. Where return air is taken from a mechanical room, boiler room or furnace room the pressure differential across the mechanical ~~room door~~ room ~~door~~ , boiler room or furnace roomdoor shall be limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, or installing a louvered door or transfer grille, or by some other means.
6. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
8. Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Commenter's Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.
https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Final Hearing Results

RM20-21	AMPC1

RM22-21

Original Proposal

IRC: M1805.4 (New)

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

<u>**M1805.4 Factory built chimney offsets.** Where a factory built chimney assembly incorporates offsets, no part of the chimney shall be at an angle of more than 30 degrees (0.52 rad.) from vertical at any point in the assembly and the chimney assembly shall not include more than 4 elbows.</u>

Reason: This language has been in the IMC for several cycles and applies to the IRC as much as it does the IMC. Its important for the user to be aware of the limitations in HT piping assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This extraction from the IMC will not result in an increase in cost because its already a requirement to follow the manufacturer's instructions for HT piping systems. It is not referenced in the IRC as it is in the IMC and needs to be to provide the user with guidance as to how to properly install the system.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

<u>**R1005.9**</u> **~~M1805.4~~Factory built chimney offsets**. Where ~~a~~ <u>fireplace manufacturer's instructions do not address</u> factory built chimney ~~assembly incorporates~~ offsets, no part of the chimney shall be at an angle of more than 30 degrees (0.52 rad.) from vertical at any point in the assembly and the chimney assembly shall not include more than 4 elbows.

Committee Reason: For the modification: The section number change places the new language in a more appropriate location in the code. The language revision incorporates the manufacturer's instructions so that the code doesn't override what the manufacturer's instructions might already address.
For the proposal as modified: The Committee agreed with the published reason statement. This is important guidance for factory built chimney offsets. (11-0)

Final Hearing Results

RM22-21	AM

RM26-21

Original Proposal

IRC: M1505.4.4, TABLE M1505.4.4

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1505.4.4 Local exhaust rates. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table M1505.4.4. <u>The listed exhaust airflow rate for bathrooms-toilet rooms shall equal or exceed the exhaust airflow rate in Table M1505.4.4 at a minimum static pressure of 0.25 inch wc in accordance with Section M1505.3.</u>

TABLE M1505.4.4 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

~~a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.~~

Reason: Traditionally, airflow rates for bathroom-toilet room fans have been listed and reported at 0.1 inch wc; this is still common practice. However, engineering calculations, field measurements, and research have shown that higher static pressures are generally needed to achieve an airflow of 50 cfm through typical exhaust duct configurations. For this reason, Footnote A to Table M1505.4.4 of the IRC has established 0.25 inch wc as the minimum static pressure at which a bathroom-toilet room exhaust fan must achieve a minimum airflow of 50 cfm. An exhaust fan that is listed to provide 50 cfm at 0.1 inch wc may only exhaust 10-30 cfm when installed with a typical exhaust duct configuration. To ensure that builders are selecting fans that can be expected to achieve the required 50 cfm in the field, Footnote A should be moved to the main section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial only and does not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that moving the requirement from the table footnote to the section text was a better location this information. (9-2)

Public Comments

Public Comment 1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1505.4.4 Local exhaust rates . *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.4.4. The~~ M1505.4.4 at one or more speed settings. The listed exhaust airflow rate for ~~bathrooms-toilet rooms shall~~ a bathroom or toilet roomexhaust fan shall equal or exceed the exhaust airflow rate in Table M1505.4.4 at a minimum static pressure of 0.25 inch wc at one or more speed settings in accordance with Section M1505.3.

Commenter's Reason: Adding the phrase "at one or more speed settings" is needed to align RM26 with the committee's action on RM17 as modified by Mathewson 2. This phrase clarifies that variable speed and multiple speed fans may be used, provided that such fans have at least one speed setting that has "the capacity to exhaust the minimum airflow rate." This clarification is needed to ensure that popular bathroom exhaust fans with multiple speed settings (e.g., 30, 50, and 80 cfm) can be approved, and permits builders to order one SKU across multiple projects that can be customized as necessary to satisfy the targeted ventilation rate (e.g., Table M1505.4.4's 50 cfm intermittent or 20 cfm continuous).
The text is also modified to clarify that the listed airflow rate is a listing associated with the exhaust fan and not with a bathroom or toilet room.

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 a current requirement and will therefore neither decrease nor increase the cost of construction.

Final Hearing Results

RM26-21	AMPC1

RM27-21

Original Proposal

IRC: M2103.3
Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

M2103.3 Piping joints. Copper and copper-alloy systems shall be soldered, brazed, or press connected. Soldering shall be in accordance with ASTM B828. Fluxes for soldering shall be in accordance with ASTM B813. Brazing fluxes shall be in accordance with AWS A5.31. Press-connect joints shall be in accordance with ASME B16.51 or ASTM F3226. Piping joints that are embedded shall be installed in accordance with the following requirements:

1. Steel pipe joints shall be welded.
2. Copper tubing shall be joined by brazing complying with Section P3003.6.1.
3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings.
4. CPVC tubing shall be joined using solvent cement joints.
5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings.
6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings.
7. Raised temperature polyethylene (PE-RT) tubing shall be joined using insert or compression fittings.

Reason: ASTM F3226 Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems includes Carbon Steel, Stainless Steel, Copper and Copper-Alloy materials. ASTM F3226 is copper and copper alloy press-connect standard and should be included along with ASME B16.51 to correctly reference the standards for copper press-connect fittings. ASTM F3226 is listed in multiple national codes for copper and copper alloy materials for these applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an additional optional standard to which press-connect fittings can be listed and not a new additional mandatory standard requirement.

There is no impact on cost and if anything would reduce cost by including all applicable press-connect fittings standards in the IRC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This addition simply provides another option for press-connect joints. (11-0)

Final Hearing Results

RM27-21	AS

RP1-21

Original Proposal

IRC: P2503.5.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (JBENGINEER@aol.com)

2021 International Residential Code

Delete and substitute as follows:

~~**P2503.5.2 Finished plumbing.** After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gastight or watertight as follows:~~

1. ~~Watertightness. Each fixture shall be filled and then drained. Traps and fixture connections shall be proven watertight by visual inspection.~~
2. ~~Gastightness. Where required by the local administrative authority, a final test for gastightness of the DWV system shall be made by the smoke or peppermint test as follows:~~
   - ~~2.1. Smoke test. Introduce a pungent, thick smoke into the system. When the smoke appears at vent terminals, such terminals shall be sealed and a pressure equivalent to a 1-inch water column (249 Pa) shall be applied and maintained for a test period of not less than 15 minutes.~~
   - ~~2.2. Peppermint test. Introduce 2 ounces (59 mL) of oil of peppermint into the system. Add 10 quarts (9464 mL) of hot water and seal the vent terminals. The odor of peppermint shall not be detected at any trap or other point in the system.~~

<u>**P2503.5.2 Drainage and vent final test.** The final test of the drainage and vent system shall be visual to determine compliance with the provisions of this code. Each fixture shall be filled and then drained. Traps and fixture connections shall be proven watertight.</u>

Reason: The testing for water and gas tightness of the drainage and vent piping system occurs during the rough-in test when the system is filled with water or air. Thus, there is no reason for testing the piping system again during the final test. The only inspection during final is of the fixture after being set. This is done by visually inspecting the installation and operating the fixture. Any improper connection is obvious during this inspection.

Peppermint testing should have never been introduced into the Residential Code. The International Plumbing Code has never had peppermint testing. The legacy plumbing codes and Uniform Plumbing Code removed the allowance of a peppermint test dating back to the 1980's. Peppermint testing is an archaic test that is completely ineffective for testing plumbing systems. Smoke testing of a residential building's drainage and vent system is unnecessary for a final inspection. If the International Plumbing Code doesn't require smoke testing in commercial buildings, the Residential Code surely should not be mandating such a test.

Cost Impact: The code change proposal will decrease the cost of construction

By removing the requirement for a smoke test, this change will lower the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: No one on the Committee can remember anyone performing a peppermint test for many years. It is unreliable to depend on a person's sense of smell to determine if there is a leak. (11-1)

Final Hearing Results

RP1-21 AS

RP3-21

Original Proposal

IRC: P2704.1

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2021 International Residential Code

Revise as follows:

P2704.1 Slip joints. Slip-joint connections shall be installed only for tubular waste piping and only between the waste ~~trap~~ outlet of a fixture and the connection to the drainage piping. Slip-joint connections shall be made with an *approved* elastomeric sealing gasket. Slip-joint connections shall be accessible. Such access shall provide an opening that is not less than 12 inches (305 mm) in its smallest dimension.

Reason: The 2015-2017 PMGCAC successfully changed IRC Section P2704.1 concerning the location of slip joints. However, an error was made at the PMGCAC level that was not noticed by anyone until the 2018 IRC was published. This could not be corrected as Errata as the code reflects exactly how the approved proposal was written.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). 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: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 24.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal only clarifies the code. Clarifications of existing requirements do not change material or labor costs and therefore, do not impact the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

RP3-21	AS

RP4-21

Original Proposal

IRC: P2709.3

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Revise as follows:

P2709.3 Installation. Lining materials shall be sloped $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope) to weep holes in the subdrain by means of a smooth, solidly formed subbase, shall be properly recessed and fastened to *approved* backing so as not to occupy the space required for the wall covering, and shall not be nailed or perforated at any point less than 1 inch (25.4 mm) above the finished threshold. <u>The assembly shall be tested in accordance with Section P2503.6</u>

Reason: A simple pointer to help the user locate the necessary information that goes hand in hand with the requirements for building a shower receptor.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is editorinal in nature and will not increase the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

RP4-21	AS

RP5-21

Original Proposal

IRC: P2717.2

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Revise as follows:

P2717.2 ~~Sink and dishwasher.~~ Dishwasher waste connection. ~~The combined discharge from a dishwasher and a one- or two-compartment sink, with or without a food-waste disposer, shall be served by a trap of not less than 1$^1/_2$ inches (38 mm) in outside diameter. The dishwasher discharge pipe or tubing shall rise to the underside of the counter and be fastened or otherwise held in that position before connecting to the head of the food-waste disposer or to a wye fitting in the sink tailpiece.~~The waste connection of a dishwasher shall connect directly to a wye branch fitting on the tailpiece of the kitchen sink, directly to the dishwasher connection of a food waste disposer, or through an air break to a standpipe. The waste line of the dishwasher shall rise and be securely fastened to the underside of the sink rim or countertop and to the top of the standpipe.

Reason: This is basically an editorial cleanup. The language in the IPC is straight forward and to the point. The language about trap size is redundant as it's covered by Table P3201.7. It is important that the waste connection be firmly fastened to the top of the standpipe due to it being a pumped waste.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is editorial in nature and will not increase cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
P2717.2 Dishwasher waste connection.
The waste connection of a dishwasher shall connect directly to a wye branch fitting on the tailpiece of the kitchen sink, directly to the dishwasher connection of a food waste disposer, or through an air break to a standpipe. The waste line of the dishwasher shall rise and be securely fastened to the underside of the sink rim or countertop~~ and to the top of the standpipe~~.Where a waste line drains into a standpipe, the waste line shall be securely fastened to the top of the standpipe.

Committee Reason: For the modification: This clears up some confusion to make sure that there are only one of three ways to make this connection.
For the proposal as modified: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

RP5-21	AM

RP6-21

Original Proposal

IRC: P2801.1
Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Revise as follows:

~~**P2801.1 Required.** *Hot water* shall be supplied to plumbing fixtures and plumbing *appliances* intended for bathing, washing or culinary purposes.~~

Reason: This is the only provision in Chapter 28 that is not related to the installation of water heating equipment. That's because it doesn't belong in Chapter 28 and is already covered in Section R306.4. 306.4 references various fixtures that require hot water. P2801.1, however, specifies human activities directly, such as "bathing, washing, and culinary purposes", as opposed to fixtures. This is an unnecessary complication, redundancy, and potential conflict within the single IRC. A "pot filler" over a range is for "culinary purposes"and a hose bib is used for "washing" cars, but these fixtures are not listed in R306.4, because they don't require hot water. R306.4 is all that is needed to scope where hot water is required.
Here is some history on these two provisions that will reveal this is baggage from the collaboration of multiple code organizations, and we should feel comfortable in cleaning it up for 2024.

The provision P2801.1 first appeared in the 1986 CABO dwelling code, section 2408.1 and was ironically one of only two provisions in the "water heater" section 2408. This would later become it's own chapter in the 1995 edition (Chapter 33). It stated the same phrase "bathing, washing, or culinary purposes". In this same 1986 code, section 207 (the equivalent to 306.4 today) already required hot wall for ALL fixtures, except for water closets. A redundancy and potential conflict was born, but where did it come from?

I'm not sure why it was first added to the CABO in 1986, because the phrase "bathing, washing, culinary purposes" comes from the BOCA Basic Plumbing Code P-1606.1 as far back as 1975. (the limit to my research access).

Section 207 in the CABO code required hot and cold water to all fixtures, except water closets, since the first 1971 edition. This would have likely come from one of the building official organizations involved. To discover which it was, I looked to see which of the legacy building codes carried it forward in their own code, after the 1971 CABO.

Nothing in the 1975 BOCA about fixtures and hot water. Nothing in the 1975 SBCCI dwelling house pamphlet. Nothing in the 1973 UBC dwelling house construction code. So... where did it come from? Well, many forget the fourth legacy code in the original CABO code, from the American Insurance Association (AIA).

In the 1967 National Building Code, by AIA, section 1401.2 required hot water to the kitchen sink (a specific fixture). In the 1975 edition of this same code, Section 607.2(a) we find the start of the list of fixtures we see today in 2021 IRC Section 306.4 (lavatory, bathtub, shower...)

So, it turns out that the insurance industry was the first to require hot water to specific fixtures (in a building code) and is the origin to Section R306.4. It was only complicated with additional provisions from the BOCA plumbing code in 1986, and looks pretty much the same today.

Let's respect this history and the compromises made to create a single residential code in the 70's, but let's also move on from nearly 40 years of conflicting redundancy. One provision is all that is necessary and that's R306.4

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no anticipated change in average construction costs associated with this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee couldn't figure out why this text was originally included in Chapter 28 (about water heaters) as the hot water requirement is already in Chapter 3. Removing this from Chapter 28 makes sense to avoid any future conflicts. (11-0)

Final Hearing Results

RP6-21	AS

RP7-21

Original Proposal

IRC: P2801.6.3 (New)

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

P2801.6.3 Appliance, equipment and insulation in pans. Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, such portions of the appliance, equipment and insulation shall be installed above the flood level rim of the pan. Supports located inside the pan to support the appliance or equipment shall be water resistant and approved.

Reason: It's important that the IRC be consistent with the IPC, IMC and IFGC. This language is the same found in the IPC and will provide more consistent enforcement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These requirements already exist and will not increase the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This same requirement is already in the mechanical and gas sections of the IRC. This section applies to water heaters. The IPC has the same requirement. (6-5)

Final Hearing Results

RP7-21	AS

RP8-21

Original Proposal

IRC: P2903.6 (New)
Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

P2903.6 Existing piping used for grounding. Existing metallic water service piping used for electrical grounding shall not be replaced with non-metallic pipe or tubing until other approved means of grounding is provided.

Reason: The replacement of a portion of that metal piping system with non-metallic piping could interrupt the continuity of the electrical grounding system thereby creating a potentially hazardous situation. This language is already in the IPC Section 601.3 and needs to be in the IRC as it would apply to one and two-family units as well and will bring consistency to the two codes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These requirement already exist and will not increase the cost of construction.

Public Hearing Results

Committee Action	**As Submitted**

Committee Reason: This is a known issue that continues to create an electrical safety hazard. This requirement is already in the IPC. (11-0)

Final Hearing Results

RP8-21	AS

RP11-21

Original Proposal

IRC: P3101.5

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 Residential Code

Revise as follows:

P3101.5 Flood resistance. In flood hazard areas as established by Table R301.2, vents shall be located at or above the elevation required in Section ~~R322.1~~ R322.2 (flood hazard areas including A Zones) or~~R322.2~~ R322.3 (coastal high-hazard areas including V Zonesand Coastal A Zones, where designated).

Reason: This proposal is editorial in nature. This proposal is to correct references to section numbers for flood resistance requirements. Code proposal RB93-07/08 was approved for inclusion in the 2009 IRC and (among many other changes) revised Section P3101.5 to reference the elevation requirements of R324.2.1 or R324.3.2. In the process of renumbering Section R324 to Section R322, it appears the P3101.5 reference to the section numbers were inadvertently revised incorrectly. For consistency with other cross references in the IRC the proposed change refers to the secondary subsection level, not the third-order subsection.
Additionally, the proposal clarifies that Section R322.3 applies to Coastal A Zones in addition to V Zones; the proposed revision to the parenthetical matches the title of Section R322.3, which has applied to Coastal A Zones since the 2015 IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal is editorial and does not change requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This is a simple editorial correction. (11-0)

Final Hearing Results

RP11-21 AS

ADM1-22 Part II

Original Proposal

IRC: SECTION 202

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

[RB] LISTED.

Equipment, materials, products or services included in a list published by an organization acceptable to the code 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> For the definition applicable in Chapter 11, see Section N1101.6.

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**

THIS CODE CHANGE WAS HEARD BY THE IRC-BUILDING COMMITTEE.

Committee Reason: This proposal was approved for consistency across all the I-codes for the defined term for 'listed'. This added language will help code officials interpret what is required for a 'listed' element. There were concerns raised that 'classified' does not mean the same thing to everyone that lists products. (Vote: 6-5)

Final Hearing Results

ADM1-22 Part II	AS

ADM7-22 Part II

Original Proposal

IRC: R102.5

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

2021 International Residential Code

Revise as follows:

~~R102.5~~ R101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically ~~referenced in the adopting ordinance~~ adopted.

Reason: Appendices are in all of the codes except for IZC. The intent is to put information about their adoption for inclusion in the same location in all of the codes immediately following the section on scope. This is already the case in the IBC, IFC, IMC, IPSDC and IWUIC. This section is added to ICCPC, IGCC, IPMC, and ISPSC. This section is relocated in the IEBC, IFGC, IPC and IRC. This will also be proposed to the first public draft of the IECC.
This proposal is submitted by the ICC Building 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 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 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 coordination item.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IRC-BUILDING COMMITTEE.

Committee Reason: This revised wording is a clarification for how appendix should be applied. This would make the location and language for the reference to appendix consistent across the I-codes. (Vote: 9-1)

Final Hearing Results

ADM13-22 Part II

Original Proposal

IRC: SECTION 202, R104

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org); Jeffrey Shapiro, P.E., FSFPE, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jeff.shapiro@intlcodeconsultants.com)

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 Residential Code

Revise as follows:

[RB] APPROVED AGENCY. An established and recognized ~~agency~~organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification~~, and~~where such organization has been *approved* ~~by the building officia~~l.

Add new definition as follows:

PEER REVIEW. An independent and objective technical review conducted by an approved third party.

Revise as follows:

~~SECTION R104~~
~~DUTIES AND POWERS OF THE BUILDING OFFICIAL~~
(Delete entire section and replace as follows)

Add new text as follows:

SECTION R104
DUTIES AND POWERS OF THE BUILDING OFFICIAL

R104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code.

R104.2 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.

R104.2.1 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.

R104.2.2 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.

R104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

R104.2.2.2 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.

R104.2.2.3 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.

R104.2.2.4 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.

R104.2.3 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.

R104.2.3.1 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.

R104.2.3.2 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.

R104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

R104.2.3.4 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 the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety

R104.2.3.4.1 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 flame spread, heat release rate, heat of combustion, smoke development and fire resistance.

R104.2.3.5 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.

R104.2.3.6 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 R104.2.3.6.1 and R104.2.3.6.2.

R104.2.3.6.1 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.

R104.2.3.6.2 Other reports. Reports not complying with Section R104.2.3.6.1 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.

R104.2.3.7 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.

R104.2.4 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 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 the modification does not lessen health, 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.

R104.2.4.1 Flood hazard areas. The building official shall not grant modifications to any provisions required in flood hazard areas as established by Table R301.2 unless a determination has been made that:

1. There is good and sufficient cause showing that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section R322 inappropriate.
2. Failure to grant the modification would result in exceptional hardship by rendering the lot undevelopable.
3. The granting of modification 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. The modification is the minimum necessary to afford relief, considering the flood hazard.
5. 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, has been submitted to the applicant.

R104.3 Applications and permits. The building official shall receive applications, review construction documents and issue permits for the erection and alteration of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

R104.4 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 upon 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.

R104.4.1 Warrant. Where the building code 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 code official for the purpose of inspection and examination pursuant to this code.

R104.5 Identification. The building official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

R104.6 Notices and orders. The building official shall issue necessary notices or orders to ensure compliance with this code in accordance with Section R113.2.

R104.7 Official records. The building official shall keep official records as required in Sections R104.7.1 through R104.7.5. 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.

R104.7.1 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.

R104.7.2 Inspections. The building official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

R104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section R104.2.3; modifications in accordance with Section R104.2.4; and documentation of the final decision of the building official for either shall be in writing and shall be retained in the official records.

R104.7.4 Tests. The building official shall keep a record of tests conducted to comply with Sections R104.2.2.4 and R104.2.3.5.

R104.7.5 Fees. The building official shall keep a record of fees collected and refunded in accordance with Section R108.

R104.8 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.

R104.8.1 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 and 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 cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

R104.9 Approved materials and equipment. Materials, equipment and devices approved by the building official shall be constructed and installed in accordance with such approval.

R104.9.1 Materials 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.
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/.

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**

THIS CODE CHANGE WAS HEARD BY THE IRC-BUILDING COMMITTEE.

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/8913/26738/preview/

Committee Modification:

~~**PEER REVIEW**~~**.** ~~An independent and objective technical review conducted by an approved third party~~.

R104.2 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~~,~~ <u>and</u> procedures~~, rules and regulations~~ in order to clarify the application of this code's provisions. Such interpretations, policies~~,~~ <u>and</u> 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.

~~**R104.2.1Listed 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.~~

<u>**R104.2.1Listed compliance**</u>**.** <u>Where this code or a referneced 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*.</u>

~~**R104.2.2 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.~~

~~**R104.2.2.1 Cost.** A technical opinion and report shall be provided without charge to the jurisdiction~~.

~~**R104.2.2.2 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.~~

~~**R104.2.2.3 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.~~

~~**R104.2.2.4 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.~~

R104.2.3.2 Application and disposition. <u>Where required, a</u> ~~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.

R104.2.3.4 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 the following, as applicable:

1. Quality
2. Strength
3. Effectiveness

4. Durability
5. Safety, other than fire safety
6. Fire safety

~~**R104.2.3.4.1 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 flame spread, heat release rate, heat of combustion, smoke development and fire resistance.~~

R104.2.3.5 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. Such tests ~~Tests~~ shall be performed by a party acceptable to the building official.

R104.2.3.6.1 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 *building 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~~.

~~**R104.2.3.7 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.~~

R104.3 Applications and permits. The building official shall receive applications, review construction documents and issue permits ~~for the erection and alteration of buildings and structures~~, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

R104.6 Notices and orders. The building official shall issue necessary notices or orders to ensure compliance with this code, ~~.~~ Notices of violations shall be in accordance with Section R113.2.

Committee Reason: This proposal, as modified, is a much needed clean up of Section R104 on Duties and Powers of the Code Official. There was a coordinated series of modifications to address areas of concern.

Section R104.2 - The removal of 'rules and regulations' removes some ambiguity and is positive from a builder's perspective.

Section R104.2.1 - The rewrite of this section adds clarity for compliance for what is considered 'listed'. This also provided listing criteria and manufacturer's instructions.

Sections R104.2.2 through R104.2.2.4 - In the IRC, the sections on technical opinions and reports was removed as a requirement for determination of compliance. Systems in the IRC are not as complex as those in many IBC buildings.

Section R104.2.3.2 - This modification makes testing only required when needed.

Section R104.2.3.5 - Adding 'such' takes the ambiguity out of what testing is required.

Section R104.2.3.6.1 - This modification makes the evaluations reports available to the code official when needed. It took out items of concern, such as costs associated with providing hard copies all the time and a requirement for 'input from the public and made available for review by the public' for evaluations.

Section R104.2.3.7 - The requirement for peer review (and the definition) was removed from the IRC proposal. Systems in the IRC are not as complex as those in many IBC buildings.

Section R104.3 - The modification clarifies the permit process.

Section R104.2.3.4 and R104.2.3.4.1 - Fire safety was include in the list of items required for consideration of 'equivalent'. While fire safety is a subsection of 'safety', pulling it out of the list could be interpreted that fire safety was more important than other items in the list. The criteria for what should be considered 'fire safety' should be included in the commentary for this section.

Section R104.6 - Breaking this requirement into two makes better sense for the reference to Section R113.2.

The work of several organizations to develop modification to this proposal to address multiple issues should be moved forward to the membership for a complete review. (Vote: 10-0)

Final Hearing Results

ADM13-22 Part II	AM

ADM48-22 Part II

Original Proposal

IRC: SECTION R112, R112.1, R112.2, R112.3, R112.4

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)

2021 International Residential Code

Revise as follows:

SECTION R112
~~BOARD~~ MEANS OF APPEALS

R112.1 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 *building official* shall be an ex officio member of said board but shall not have a vote on any matter before the board.~~ The board of appeals shall be appointed by the applicable governing ~~body~~ 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 official*.

R112.2 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 ~~equally good~~ equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code.

R112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training ~~to pass judgment~~ on matters pertaining to ~~building construction~~ the provisions of this code and are not employees of the *jurisdiction*.

R112.4 Administration. The *building official* shall take ~~immediate~~ action 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 **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IRC-BUILDING COMMITTEE.

Committee Reason: The proposal was disapproved. In R112.4 the word 'immediate' should not be struck. It leaves the timing ambiguous. Striking the sentence in Section R112.1 would remove the restriction that the code official could not vote, leaving the question, why would the building official be voting? Some also felt the building official should be an ex officio, non-voting member. This language is more confusing than the original. (Vote: 7-3)
One argument against disapproval was that removing the building official from the board is not giving them a vote.

Public Comments

Public Comment 1

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

R112.4 Administration. The *building official* shall take action i~~mmediate~~ without delay in accordance with the decision of the board.

Commenter's Reason: The public comments are dividing the question into two parts - R112 through R112.3 is Part 1 and R112.4 is Part 2.
PART 2

This modification is to revise Section R112.4 to so that the term 'immediate' is replaces with 'without delay' as a reasonable compromise for a building official to react promptly to a board of appeals decision, without having to respond immediately following the meeting.

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 change with no change in construction requirements.

Public Comment 2

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

SECTION R112
~~BOARD~~ <u>MEANS</u> OF APPEALS

R112.1 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 building official shall be an ex officio member of said board but shall not have a vote on any matter before the board.~~The board of appeals shall be appointed by the <u>applicable</u> governing ~~body~~ <u>authority</u> and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business, and shall render<u>all</u> decisions and findings in writing to the appellant with a duplicate copy to the*building official*.

R112.2 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 ~~equally good~~ <u>equivalent</u> or better form of construction is proposed. The board shall not have authority to waive requirements of this code.

R112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training ~~to pass judgment~~ on matters pertaining to ~~building construction~~ <u>the provisions of this code</u> and are not employees of the*jurisdiction*.

Commenter's Reason: The public comments are dividing the question into two parts - R112 through R112.3 is Part 1 and R112.4 is Part 2.

PART 1

The BCAC respectively disagrees with the IRC committee's comment on the deleted sentence in Section R112.1. During the last cycle, ADM40-19 edited the sections for the Board of Appeals in each code book to limit the section to just the right and process for someone to have a means of appeal and ADM43-19 Part II, created Appendix AV for the Board of Appeals which is intended to provide a template for jurisdictions that do not already have such language. (The appendix for Board of Appeals now exists in all code books except IZC and ICCPC.) The make-up of the board is addressed in the Appendix. The role of the code official in the Board of Appeals is addressed in Sections AV101.1 and AV101.3. Since language regarding the makeup of the Board of Appeals is in the appendix and Section R112 is limited to the means of appeal, this change removes any requirements for the Board of Appeals from Section R112, which allows the jurisdiction to determine the makeup of the Board of Appeals in their specific ordinances or through the adoption of the appendix.
Appendix AV - Board of AppealsAV101.1 Scope. A board of appeals shall be established within the jurisdiction for the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section R112. The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the building official pertaining to the application and intent of this code for the purpose of issuing orders pursuant to these provisions.

AV101.3 Membership of board. The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for [INSERT NUMBER OF YEARS] years or until a successor has been appointed. The board member's terms shall be staggered at intervals, so as to provide continuity. The building official shall be an ex officio member of said board but shall not vote on any matter before the board.

Cost Impact: The net effect of the Public Comment and 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.

Final Hearing Results

ADM48-22 Part II	AMPC1,2

F75-21 Part II

Original Proposal

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)

2021 International Residential Code

Revise as follows:

P2904.1 General. The design and installation of ~~residential~~ automatic fire sprinkler systems shall be in accordance with NFPA 13D or Section P2904, which shall be considered to be equivalent to NFPA 13D. Partial ~~residential~~ automatic sprinkler systems shall be permitted to be installed only in buildings not required to be equipped with a ~~residential~~ automatic sprinkler system. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose ~~fire~~ automatic sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures. A stand-alone automatic sprinkler system shall be separate and independent from the water distribution system. A backflow preventer shall not be required to separate an automatic sprinkler system from the water distribution system, provided that the sprinkler system complies with all of the following:

1. The system complies with NFPA 13D or Section P2904.
2. The piping material complies with Section P2906.
3. The system does not contain antifreeze.
4. The system does not have a fire department connection.

P2904.3.4 Drain. A means to drain the automatic sprinkler system shall be provided on the system side of the water distribution shutoff valve.

P2904.4.2 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section P2904.4.1.
2. The design flow rate for a room having two or more sprinklers shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section P2904.4.1, and multiplying that flow rate by 2.
3. Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required flow rate for that room shall comply with the sprinkler manufacturer's instructions.
4. The design flow rate for the automatic sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1, 2 and 3.
5. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches (203 mm) in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

P2904.7 Instructions and signs. An owner's manual for the ~~fire~~ automatic sprinkler system shall be provided to the *owner*. A sign or valve tag shall be installed at the main shutoff valve to the water distribution system stating, "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign."

P2904.8.1 Preconcealment inspection. The following items shall be verified prior to the concealment of any automatic sprinkler system piping:

1. Sprinklers are installed in all areas as required by Section P2904.1.1.
2. Where sprinkler water spray patterns are obstructed by construction features, luminaires or ceiling fans, additional sprinklers are installed as required by Section P2904.2.4.2.
3. Sprinklers are the correct temperature rating and are installed at or beyond the required separation distances from heat sources as required by Sections P2904.2.1 and P2904.2.2.
4. The pipe size equals or exceeds the size used in applying Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, the size used in the hydraulic calculation.
5. The pipe length does not exceed the length permitted by Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, pipe lengths and fittings do not exceed those used in the hydraulic calculation.
6. Nonmetallic piping that conveys water to sprinklers is *listed* for use with fire sprinklers.
7. Piping is supported in accordance with the pipe manufacturer's and sprinkler manufacturer's installation instructions.
8. The piping system is tested in accordance with Section P2503.7.

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 no technical changes in this proposal. It is for term correlation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This is is a necessary editorial revision being accomplished across all of the codes to standardize terminology. (11-0)

Final Hearing Results

F75-21 Part II AS

G1-22 Part II

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@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

Revise as follows:

[RB] GYPSUM BOARD. ~~The generic name for a family of sheet products~~A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing. ~~Gypsum wallboard, gypsum sheathing, gypsum base for gypsum *veneer* plaster, exterior gypsum soffit board, predecorated gypsum board and water-resistant gypsum backing board complying with the standards listed in Section R702.3 and Part IX of this code are types of gypsum board.~~

[RB] GYPSUM PANEL PRODUCT. The general name for a family of sheet products consisting essentially of gypsum complying with the standards specified in Section R702.3 and Part IX of this code.

[RB] GYPSUM SHEATHING. Gypsum panel products specifically manufactured with enhanced water resistance for use as a substrate for exterior surface materials.

[RB] GYPSUM WALLBOARD. A gypsum board used primarily as 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 INTERNATIONAL RESIDENTIAL BUILDING COMMITTEE.

Committee Reason: 'Gypsum board' as a subset of 'gypsum wall products' is consistent with common industry terminology. Approval would be consistent with S58-22. (Vote: 10-0)

Final Hearing Results

G1-22 Part II	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

M4-21 Part II

Original Proposal

IRC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] HEAT PUMP.** An *appliance* having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.~~

<u>[MP] HEAT PUMP</u>.

<u>A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance</u>.

Reason: There are two different definitions in the I-codes for “heat pump”. The IRC definition identifies heat pumps as an appliance, and the IMC identifies heat pumps as are refrigeration system. This definition is clarifying that a heat pump could be either an appliance or a refrigeration system. This definition is also simplified that a heat pump is transferring heat into a space or substance. The reference to “beneficial purpose” in the IMC is commentary. The proposed new common definition is closely aligned with the term used in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.
For information purposes, the following are the other definitions:

From the IRC: [MP] HEAT PUMP. An appliance having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

From the IMC: HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

From ASHRAE 15: HEAT PUMP a refrigerating system used to transfer heat into a space or substance.
From UL 60335-2-40: HEAT PUMP appliance which takes up heat at a certain temperature and releases heat at a higher temperature

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 provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The definition is not consistent for the consumer trying to do construction, which may be the homeowner. (6-5)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Submitted

Commenter's Reason: M4-21 Part I was approved as submitted. For consistency between the IRC mechanical and the IMC. A term that is used throughout the I-codes should have the same definition. This proposal needs to be approved for consistency. There was no opposing testimony on this proposal.
The PMGCAC is puzzled by the Committee's published reason statement for disapproval. We do not understand why "consumers" or "homeowners" would be confused by the revised definition in a *code*. Code definitions are only for support of the code text where that defined term is used.

One committee member mentioned that the revised definition does not meet the "Websters" definition... Here is Webster's definition (note the underline):

": an apparatus for heating or cooling (such as a building) by transferring heat by mechanical means from or to an external reservoir (such as the ground, water, or outside air)"

From the Energy.gov webpage on Heat Pumps:

"For climates with moderate heating and cooling needs, heat pumps offer an energy-efficient alternative to furnaces and air conditioners. Like your refrigerator, <u>heat pumps use electricity to move heat</u>from a cool space to a warm space, making the cool space cooler and the warm space warmer. During the heating season, <u>heat pumps move heat</u>from the cool outdoors into your warm house and during the cooling season, heat pumps move heat from your cool house into the warm outdoors. <u>Because they move heat rather than generate hea</u>,t heat pumps can provide equivalent space conditioning at as little as one quarter of the cost of operating conventional heating or cooling appliances."

We urge the voters to approve this proposal to make terminology consistent across the codes and in agreement with other standards.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal is only a clarification of a definition.

Final Hearing Results

M4-21 Part II	AS

M8-21 Part III

Original Proposal

IRC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A THREE PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART 3 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] REFRIGERANT.** A substance used to produce refrigeration by its expansion or evaporation~~.
[MP] REFRIGERANT.
The fluid used for heat transfer in a refrigeration system that refrigerant undergoes a change of state to absorb heat.

Reason: There are three different definitions in the I-codes for "refrigerant". This proposal is to use the current definition for the term in the IFC. The IFC definition provides the best detail as to what a refrigerant is, and aligns with ASHRAE 15, which is referenced in the IMC. The IRC and IMC definitions are not as precise.
For information purposes, the following are the other definitions:

From the IRC: [MP] REFRIGERANT. A substance used to produce refrigeration by its expansion or evaporation.

From the IMC: REFRIGERANT. A substance utilized to produce refrigeration by its expansion or vaporization.

From ASHRAE 15: REFRIGERANT the fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

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 provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
[MP] REFRIGERANT. The fluid used for heat transfer in a refrigeration system that ~~refrigerant~~ undergoes a change of state to absorb heat.

Committee Reason: For the modification: The modification makes more sense. It correlates between the codes and clarifies the IRC definition.
For the proposal as modified: It will correlate between the three codes. (11-0)

Final Hearing Results

M8-21 Part III	AM

M10-21 Part II

Original Proposal

IRC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE AND FIRE CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[MP]
~~REFRIDGERATING~~ REFRIGERATION SYSTEM

.
A combination of interconnected parts ~~forming a closed circuit~~ in which refrigerant is enclosed and is circulated for the purpose of extracting, then rejecting, heat. ~~A direct refrigerating system is one in which the evaporator or condenser of the refrigerating system is in direct contact with the air or other substances to be cooled or heated. An indirect refrigerating system is one in which a secondary coolant cooled or heated by the refrigerating system is circulated to the air or other substance to be cooled or heated.~~

Reason: The proposal will better correlate the I-Codes with the industry standards, ASHRAE 15, for using the term refrigeration system rather than refrigerating systems. No technical change is intended.

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 provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Correlates the I-codes under one definition. (11-0)

Final Hearing Results

M10-21 Part II AS

M66-21 Part II

Original Proposal

IRC: M2002.4, M2002.4.1 (New)
Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

M2002.4 Pressure relief valve. Boilers shall be equipped with pressure relief valves with minimum rated capacities for the equipment served. Pressure relief valves shall be set at the maximum rating of the boiler. ~~Discharge shall be piped to drains by gravity to within 18 inches (457 mm) of the floor or to an open receptor.~~

M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.
15. The end of the discharge pipe shall be cut at a 45-degree angle.

Reason: Part I REASONING: The text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance.
PART II REASONING: Oddly, Section M2002.4 has minimal requirements for pressure relief valve discharge pipes. A boiler doesn't "know" what type of building it is located in. The requirements for a pressure relief valve discharge pipe should be identical to what is in the IMC for

the same application. Uniformity across the codes on these requirements will improve compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). 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: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 31.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The relief valve piping already has to be installed and if relief valve manufacturers' instructions are being followed, many of these requirements are already being followed.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The air gap verses the air break is confusing. It doesn't make sense that the boiler relief valve discharges to a water heater pan. (10-1)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air ~~gap located gap~~break located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air~~gap. gap~~break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the ~~water heater~~ boileror storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.

10. Terminate not more than 6 inches (152 mm) ~~and not less than two times the discharge pipe diameter~~ above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. ~~Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.~~
15. ~~The end of the discharge pipe shall be cut at a 45-degree angle.~~

Commenter's Reason: This public comment corrects Committee identified problems and also makes small changes to correlate the text with Part I of this proposal, As Modified.

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 is only a clarification of the original proposal.

Final Hearing Results	
M66-21 Part II	AMPC1

M99-21 Part II

Original Proposal

IRC: TABLE P2906.6, TABLE M2101.1, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A312; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A312; ASTM A778
Steel	ASME B16.9; ASME B16.11; ASME B16.28

TABLE M2101.1 HYDRONIC PIPING AND FITTING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Acrylonitrile butadiene styrene (ABS) plastic pipe	1, 5	ASTM D1527, ASTM F2806, ASTM F2969	Solvent cement joints	—
Chlorinated poly (vinyl chloride) (CPVC) pipe and tubing	1, 2, 3	ASTM D2846	Solvent cement joints, compression joints and threaded adapters	—
Copper and copper-alloy pipe	1	ASTM B42, ASTM B43, ASTM B302	Brazed, soldered and mechanical fittings threaded, welded and flanged	—
Copper and copper-alloy tubing (Type K, L or M)	1, 2	ASME B16.51, ASTM B75, ASTM B88, ASTM B135, ASTM B251, ASTM B306	Brazed, soldered, press-connected and flared mechanical fittings	Joints embedded in concrete shall be brazed
Cross-linked polyethylene (PEX)	1, 2, 3	ASTM F876; ASTM F3253	(See PEX fittings)	Install in accordance with manufacturer's instructions
Cross-linked polyethylene/ aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	1, 2	ASTM F1281 or CAN/CSA B137.10	Mechanical, crimp/insert	Install in accordance with manufacturer's instructions
PEX fittings	—	ASTM F877, ASTM F1807, ASTM F1960, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F3253; ASTM F3347	Copper crimp/insert fittings, cold expansion fittings, stainless steel clamp, insert fittings	Install in accordance with manufacturer's instructions
Polybutylene (PB) pipe and tubing	1, 2, 3	ASTM D3309	Heat-fusion, crimp/insert and compression	Joints in concrete shall be heat-fused
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	1, 2, 3	ASTM F1282, CSA B137.9	Mechanical, crimp/insert	—
Polypropylene (PP)	1, 2, 3	ISO 15874, ASTM F2389	Heat-fusion joints, mechanical fittings, threaded adapters, compression joints	—
Raised temperature polyethylene (PE-RT)	1, 2, 3	ASTM F2623, ASTM F2769, CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Raised temperature polyethylene (PE-RT) fittings	1, 2, 3	ASTM D3261, ASTM F1807, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F2769, ASTM F3347; CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Steel pipe	1, 2	ASTM A53, ASTM A106	Brazed, welded, threaded, flanged and mechanical fittings	Joints in concrete shall be welded. Galvanized pipe shall not be welded or brazed.
Steel tubing	1	ASTM A254	Mechanical fittings, welded	—

For SI: °C = [(°F) - 32]/1.8.

a. Use code:

    1. Above ground.

    2. Embedded in radiant systems.

    3. Temperatures below 180°F only.

    4. Low temperature (below 130°F) applications only.

    5. Temperatures below 160°F only.

b. Standards as listed in Chapter 44.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM F3347	Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3347 is titled, "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing and contains information for metallic fittings for both PEX and PERT systems intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3347, Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds a standard for PEX and PERT fittings and is not expected to increase or decrease the costs of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This new standard provides another option for hydronic piping. (11-0)

Final Hearing Results

M99-21 Part II AS

M100-21 Part II

Original Proposal

IRC: TABLE M2101.1, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

TABLE M2101.1 HYDRONIC PIPING AND FITTING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Acrylonitrile butadiene styrene (ABS) plastic pipe	1, 5	ASTM D1527, ASTM F2806, ASTM F2969	Solvent cement joints	—
Chlorinated poly (vinyl chloride) (CPVC) pipe and tubing	1, 2, 3	ASTM D2846	Solvent cement joints, compression joints and threaded adapters	—
Copper and copper-alloy pipe	1	ASTM B42, ASTM B43, ASTM B302	Brazed, soldered and mechanical fittings threaded, welded and flanged	—
Copper and copper-alloy tubing (Type K, L or M)	1, 2	ASME B16.51, ASTM B75, ASTM B88, ASTM B135, ASTM B251, ASTM B306	Brazed, soldered, press-connected and flared mechanical fittings	Joints embedded in concrete shall be brazed
Cross-linked polyethylene (PEX)	1, 2, 3	ASTM F876; ASTM F3253	(See PEX fittings)	Install in accordance with manufacturer's instructions
Cross-linked polyethylene/ aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	1, 2	ASTM F1281 or CAN/CSA B137.10	Mechanical, crimp/insert	Install in accordance with manufacturer's instructions
PEX fittings	—	ASTM F877, ASTM F1807, ASTM F1960, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F3253; ASTM F3348	Copper crimp/insert fittings, cold expansion fittings, stainless steel clamp, insert fittings	Install in accordance with manufacturer's instructions
Polybutylene (PB) pipe and tubing	1, 2, 3	ASTM D3309	Heat-fusion, crimp/insert and compression	Joints in concrete shall be heat-fused
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	1, 2, 3	ASTM F1282, CSA B137.9	Mechanical, crimp/insert	—
Polypropylene (PP)	1, 2, 3	ISO 15874, ASTM F2389	Heat-fusion joints, mechanical fittings, threaded adapters, compression joints	—
Raised temperature polyethylene (PE-RT)	1, 2, 3	ASTM F2623, ASTM F2769, CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Raised temperature polyethylene (PE-RT) fittings	1, 2, 3	ASTM D3261, ASTM F1807, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F2769, ASTM F3348; CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Steel pipe	1, 2	ASTM A53, ASTM A106	Brazed, welded, threaded, flanged and mechanical fittings	Joints in concrete shall be welded. Galvanized pipe shall not be welded or brazed.
Steel tubing	1	ASTM A254	Mechanical fittings, welded	—

For SI: °C = [(°F) - 32]/1.8.

a. Use code:

1. Above ground.
2. Embedded in radiant systems.
3. Temperatures below 180°F only.
4. Low temperature (below 130°F) applications only.
5. Temperatures below 160°F only.

b. Standards as listed in Chapter 44.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3348-18 Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3348 is titled, "Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and contains information on plastic fittings for PEX and PERT systems and should be included in the fittings table. The fittings are intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3348 Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The proposal adds a standard for PEX and PERT fittings and is not expected to increase or decrease the costs of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

M100-21 Part II AS

P6-21 Part II

Original Proposal

IRC: P2603.2.1.1 (New), P2603.2.1, M1308.2.1, M1308.2.2

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

P2603.2.1.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

P2603.2.1 Protection against physical damage. In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than $1^{1}/_{4}$ inches (31.8 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 Gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

Revise as follows:

M1308.2.1 Piping through bored holes or notches. Where *piping* is installed through holes or notches in framing members and is located less than ~~$1^{1}/_{2}$ inches (38 mm)~~ 1 1/4 inches (32 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the pipe shall be protected by shield plates that cover the width of the pipe and the framing member and that extend 2 inches (51 mm) to each side of the framing member. Where the framing member that the piping passes through is a bottom plate, bottom track, top plate or top track, the shield plates shall cover the framing member and extend 2 inches (51 mm) above the bottom framing member and 2 inches (51 mm) below the top framing member.

M1308.2.2 Piping in other locations. Where piping is located within a framing member and is less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the piping shall be protected by shield plates that cover the width and length of the piping. Where piping is located outside of a framing member and is located less than $1^{1}/_{2}$ inches (38 mm) from the nearest edge of the face of the framing member to which the membrane will be attached, the piping shall be protected by shield plates that cover the width and length of the piping.

Reason: The safest place to install piping is in the middle of the wall. But in a typical 3-1/2 inch stud wall, even a 1/2-inch pipe (5/8-inch OD) ends up slightly nearer than the requisite 1-1/2 inch setback from either edge. Depending on enforcement, installers are often required to put shield plates on both sides of the stud. This makes no sense. By simply reducing the setback from 1-1/2 inches to 1-1/4 inches, both 1/2-inch and 3/4-inch piping can be safely installed in the center of the wall without triggering the need for shield plates on both sides. This encourages quality workmanship instead of penalizing it. The pipes are still safely out of range of drywall screws up to 1-1/2 inches long. This proposal is consistent with the National Electrical Code, which specifies a 1-1/4 inch setback from the edge of a stud. It is also consistent with the IRC, which also specifies a 1-1/4 inch setback. Note that the Uniform Plumbing Code allows a 1-inch distance before a shield plate is required . This proposal will bring consistency to the I-Codes.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). 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: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reducing the distance from the face of the stud for where shield plates are required could result in *fewer* plates needed for a project. The need for fewer plates would reduce cost of construction but that cost reduction would be insignificant.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
P2603.2.1 Protection against physical damage.
In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1
$^{1}/_{4}$ inches (31.8 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. ~~Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 Gage).~~ Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

Committee Reason: For the modification: This eliminates a redundancy in the proposal.
For the proposal as modified: This change is to provide consistency in all the codes. (10-1)

Final Hearing Results

P6-21 Part II	AM

P54-21 Part II

Original Proposal

IRC: P2801.9 (New)
Proponents: Jeremy Brown, NSF International, NSF International (brown@nsf.org)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Add new text as follows:

<u>**P2801.9 Lead Content.** Water heaters shall comply with NSF 372 and shall have a weighted average lead content of 0.25% or less.</u>

Reason: Section P2906.2.1 was created to implement lead content requirements of the US Safe Drinking Water Act (SDWA) and requires NSF 372. In September 2020, the EPA finalized its final rule for interpreting the Safe Drinking Water Act. The final rule did change scope of products affected by the lead content requirements and cited water heaters as fixtures used for potable water according the final rule. See SDWA definition below:
"Fixture means a receptacle or device that is connected to a water supply system or discharges to a drainage system or both. Fixtures used for potable uses shall include but are not limited to: (1) Drinking water coolers, drinking water fountains, drinking water bottle fillers, dishwashers; (2) Plumbed in devices, such as point-of-use treatment devices, coffee makers, and refrigerator ice and water dispensers; and (3) Water heaters, water meters, water pumps, and water tanks, unless such fixtures are not used for potable uses."

Final rule is found at https://www.federalregister.gov/documents/2020/09/01/2020-16869/use-of-lead-free-pipes-fittings-fixturessolderand-flux-for-drinking-water Water heaters are singled out for proposed code sections because they are not consistently interpreted as intended to convey or dispense drinking water. As such they need a specific code section to require lead content to be consistent with the SDWA. I have submitted this code change as well as a similar one to give the committee options for how this could be approved.

NSF/ANSI/CAN 372 is the American and Canadian National Standards for determining lead content of drinking water system components.

Bibliography: NSF/ANSI/CAN 372-2020 Drinking Water System Components-Lead Content

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The SDWA already mandates that water heaters be third party certified and lead free so this proposal does not increase the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The final rules from the USEPA concerning the reduced lead level for components in drinking water systems states that a water heater does supply drinking water as the water could be used for drinking, especially from a lavatory faucet. (11-0)

Final Hearing Results

P54-21 Part II	AS

P62-21 Part II

Original Proposal

IRC: TABLE P2906.5, ASTM Chapter 44 (New)

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

TABLE P2906.5 WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846; ASTM F441; ASTM F442/F442M; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) plastic pipe	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75/B75M; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE) pipe	ASTM F1986
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe	ASTM F1282
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Stainless steel (Type 304/304L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel (Type 304/304L) tubing	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel (Type 316/316L) tubing	ASTM A269; ASTM A312; ASTM A554; ASTM A778

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing

Reason: Stainless steel material as indicated in the IPC is proposed to be added for applications where stainless steel pipe, tubing and fittings are necessary for corrosion resistance and also aligns with IPC. Add ASTM A269 and A554 which are equivalent to those standards included as additional standard options for product listing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding an additional standard option for stainless steel pipe to be listed to will not increase or decrease the cost of construction. If anything, it has potential to decrease the cost since this increases the number of suppliers of pipe and tubing that can be purchased.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

TABLE P2906.5 WATER DISTRIBUTION PIPE	
Stainless steel (Type 304/304L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel (Type 304/304L) tubing	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel (Type 316/316L) tubing	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778

Committee Reason: For the modification: The standard is not appropriate for water distribution piping material.
For the proposal as modified: This proposal adds another option for water distribution piping. (11-0)

Final Hearing Results

P62-21 Part II	AM

P63-21 Part II

Original Proposal

IRC: TABLE P2906.6, ASTM Chapter 44 (New)

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778; ASTM F3226
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778; ASTM F3226
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F3226

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing

Reason: ASTM A269 and A554 are proposed Stainless Steel standards that are included in other nationally recognized codes and are commonly used in potable water applications. ASTM F3226 *Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems,* includes Steel and Stainless steel alloy, is currently included for copper and copper alloy in this table, and should be added to the others to increase the options for materials to be used in water supply fitting installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
ASTM A269, A554, and F3226 are additional optional standards to which press-connect fittings can be constructed and/or listed to. By providing the additional proposed standards, fittings made from these materials offer additional options for the specifier and/or installer with no additional cost impact as they are optional and not mandatory standard requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

TABLE P2906.6 PIPE FITTINGS	

Stainless steel (Type 304/304L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778; ASTM F3226
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778; ASTM F3226

Committee Reason: For the modification: The standard is not appropriate for water distribution piping material.
For the proposal as modified: This adds another option for water distribution piping. (11-0)

Final Hearing Results

P63-21 Part II	AM

P64-21 Part II

Original Proposal

IRC: TABLE P2906.6, ASTM Chapter 44 (New)
Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A312; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A312; ASTM A778
Steel	ASME B16.9; ASME B16.11; ASME B16.28

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3347-20a — Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3347 is titled, "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing and contains information for metallic fittings for both PEX and PERT systems intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3347, Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds a standard for PEX and PERT fittings and is not expected to increase or decrease the costs of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This adds another option for piping material. (11-0)

Final Hearing Results

P64-21 Part II	AS

P65-21 Part II

Original Proposal

IRC: TABLE P2906.6, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3348; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3348; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A312; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A312; ASTM A778
Steel	ASME B16.9; ASME B16.11; ASME B16.28

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3348-20b Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3348 is titled, "Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and contains information on plastic fittings for PEX and PERT systems and should be included in the fittings table. The fittings are intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3348 Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds a standard for PEX and PERT fittings and is not expected to increase or decrease the costs of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This adds another option for piping material. (11-0)

Final Hearing Results

P65-21 Part II	AS

P68-21 Part II

Original Proposal

IRC: TABLE P2903.9.4, IAPMO Chapter 44 (New)

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

TABLE P2903.9.4 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F1970, CSA B125.3, MSS SP-122
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, IAPMO Z1157, MSS SP-67, MSS SP-80, MSS SP-110, MSS SP-139
Gray and ductile iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-42, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, IAPMO Z1157, NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F2389
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F1970, MSS SP-122
Stainless Steel	IAPMO Z1157

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761-USA

Z1157-2014e1 Ball Valves

Reason: The proposed IAPMO Z1157 ANSI accredited standard covers ball valves NPS-1/8 to NPS-4, with minimum rated working pressures of 125psi at 73°F, intended for use in water supply and distribution systems, and specifies requirements for materials, physical characteristics, performance, testing, and markings. The proposed standard is currently referenced in other nationally recognized codes such as the IPC and will provide the user the opportunity to choose additional valves listed to this standard for these applications. Stainless steel material is proposed to be added for applications where stainless steel pipe, tubing and fittings are necessary for corrosion resistance. The proposed stainless steel standards are also referenced in other nationally recognized codes and are commonly used for potable water distribution and hydronic applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of this standard into the IRC does not increase or decrease the cost of construction, but allows for an additional option for selecting valves that are listed for use in these applications. The inclusion of this standard does not mandate the use of an IAPMO Z1157 listed ball valve, it provides it as an option. Adding Stainless Steel as an option does not impact the cost but provides an additional material option for the specifier and/or installer.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Public Comments

Public Comment 1

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE P2903.9.4 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F1970, CSA B125.3, MSS SP-122
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, IAPMO Z1157, MSS SP-67, MSS SP-80, MSS SP-110, MSS SP-139
Gray and ductile iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-42, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, IAPMO Z1157, NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F2389
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F1970, MSS SP-122
Stainless Steel	IAPMO Z1157, ASME A112.4.14

Commenter's Reason: Add ASME A112.4.14 *Manually Operated Valves for Use in Plumbing Systems*, to Stainless Steel in this table as the standard covers valves in stainless steel as well as other materials already covered by ASME A112.4.14 in this table.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Adding this standard already included in this table for other materials does not increase or decrease the cost.

Final Hearing Results

P68-21 Part II AMPC1

P74-21 Part II

Original Proposal

IRC: P2906.9.1.2, P2906.9.1.3, ASTM Chapter 44 (New)
Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

P2906.9.1.2 CPVC plastic pipe. Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe, fitting or solvent cement manufacturer's installation instructions.
Solvent cement joints shall be permitted above or below ground.
Where such instructions require a primer to be used, an*approved* primer shall be applied, and a solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2855.
Where such instructions allow for a one-step solvent cement, yellow or red in color and conforming to ASTM F493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet, and in accordance with ~~ASTM D2846 or ASTM F493~~. ASTM F3328
~~Solvent cement joints shall be permitted above or below ground~~.

P2906.9.1.3 CPVC/AL/CPVC pipe. Joint surfaces shall be clean and free from moisture, and an*approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ~~ASTM D2846 or ASTM F493~~ ASTM D2855. Solvent-cemented joints shall be installed above or below ground.

Exception: A primer shall not be required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement used is yellow in color.
3. The solvent cement is used only for joining $^1/_2$-inch (12.7 mm) through 1-inch (25 mm) diameter CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.
5. The joint is made in accordance with ASTM F3328.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D2855-20	Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
F3328-19	Standard Practice for the One-Step (Solvent Cement Only) Method of Joining Poly(Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This adds an option to use a one step cement for PVC and provides a standard for assembling these types of joints. (7-4)

Final Hearing Results

P74-21 Part II	AS

P75-21 Part II

Original Proposal

IRC: P2906.9.1.2
Proponents: Forest Hampton, Lubrizol, Inc., Lubrizol, Inc. (forest.hampton@lubrizol.com)

2021 International Residential Code

Revise as follows:

P2906.9.1.2 CPVC plastic pipe. Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe, fitting or solvent cement manufacturer's installation instructions. Where such instructions require a primer to be used, an *approved* primer shall be applied, and a solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. Where such instructions allow for a one-step solvent cement, yellow<u>, green,</u> or red in color and conforming to ASTM F493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent cement joints shall be permitted above or below ground.

Reason: Currently, it can be difficult to see the yellow solvent cement ring on a tan CTS CPVC joint during inspection. A high contrast cement has been asked for from the field to aid in the inspection of CPVC joints. The color green was chosen because of its high contrast against the tan pipe and fittings and green is not currently used to identify any other type of cement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of another one-step solvent cement color will not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

P75-21 Part II	AS

P76-21 Part II

Original Proposal

IRC: P2906.9.1.3, ASTM Chapter 44 (New)
Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

P2906.9.1.3 CPVC/AL/CPVC pipe. Joint surfaces shall be clean and free from moisture, and an *approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ~~ASTM D2846 or ASTM F493~~ASTM D2855. Solvent-cemented joints shall be installed above or below ground.

Exception: A primer shall not be required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement used is yellow in color.
3. The solvent cement is used only for joining $^{1}/_{2}$-inch (12.7 mm) through 1-inch (25 mm) diameter CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.
5. The joint is made in accordance with ASTM F3328.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D2855-20	Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly(Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
F3328-19	Standard Practice for the One-Step (Solvent Cement Only) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This provides more updated standards for assembling solvent weld joints. (9-2)

Final Hearing Results

P76-21 Part II AS

P117-21 Part II

Original Proposal

IRC: P3003.9.2, ASTM Chapter 44 (New)
Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

P3003.9.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer, or other *approved* primer, that conforms to ASTM F656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3 or CSA B181.2 shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and shall be in accordance with ASTM D2855. Solvent-cement joints shall be installed above or below ground.

Exception: A primer shall not be required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D2564.
2. The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in nonpressure applications in sizes up to and including 4 inches (102 mm) in diameter
3. <u>The joint is made in accordance with ASTM F3328.</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>F3328-19</u>	<u>Standard Practice for the One-Step (Solvent Cement Only) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets</u>

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: These instructions are necessary to properly make the joint. (6-5)

Final Hearing Results

P117-21 Part II AS

P120-21 Part II

Original Proposal

IRC: TABLE P3002.1(1), TABLE P3002.1(2), TABLE P3002.2, P3003.11.1, ASTM Chapter 44 (New)

Proponents: William Chapin, Professional Code Consulting, LLC, Professional Code Consulting, LLC (bill@profcc.us)

2021 International Residential Code

Revise as follows:

TABLE P3002.1(1) ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM D2680; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75/B75M; ASTM B88; ASTM B251/B251M; ASTM B306
Galvanized steel pipe	ASTM A53/A53M
Polyolefin pipe	ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE P3002.1(2) UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

PIPE	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888;CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75/B75M; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412;ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE P3002.2 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS35, SDR 35 (PS 45), PS50, PS100, PS140, SDR 23.5 (PS 150) and PS200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS140 and PS 200; with a solid, cellular core or composite wall	ASTM D3034; ASTM F891; ASTM F1488; CSA B182.2; CSA B182.4
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA 8–93; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75/B75M; ASTM B88; ASTM B251/B251M
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F1412; ASTM F3371;CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with solid, cellular core or composite wall	ASTM D2665; ASTM D2949; ASTM D3034; ASTM F1412; CSA B182.2; CSA B182.4
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949, ASTM F1488
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C425; ASTM C700

For SI: 1 inch = 25.4 mm.

P3003.11.1 Heat-fusion joints. Heat-fusion joints for polyolefin pipe and tubing joints shall be installed with socket-type heat-fused polyolefin fittings or electrofusion polyolefin fittings. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F1412, ASTM F3371. or CSA B181.3.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3371-19 Standard Specification for Polyolefin Pipe and Fittings for Drainage, Waste, and Vent Applications

Reason: ASTM F1412 for corrosive waste is currently being used for typical DWV applications. There is no restriction within F1412 to not allow this and still should be referenced, but it is overly restrictive for manufacturer to make polyolefin pipe/fittings for typical DWV applications to have to go to the extreme of a chemical resistance test in F1412 if the product was not to be used for corrosive waste.
For this reason, ASTM F3371 was developed and published as it includes the same requirements as F1412 minus the chemical resistance testing. Also note that other ASTM standards for DWV application do not include a chemical resistance test.

Bibliography: ASTM F3371-19 Standard Specification for Polyolefin Pipe and Fittings for Drainage, Waste, and Vent Applications

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds another option for piping, Options in the code tend to decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This adds another option for piping material for these applications. (11-0)

Final Hearing Results

P120-21 Part II AS

P140-21 Part II

Original Proposal

IRC: TABLE P3009.11, TABLE P3302.1

Proponents: Shawn Coombs, Advanced Drainage Systems, Inc., Advanced Drainage Systems, Inc. (shawn.coombs@ads-pipe.com)

2021 International Residential Code

Revise as follows:

TABLE P3009.11 DISTRIBUTION PIPE

Portions of table not shown remain unchanged.

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F405

TABLE P3302.1 SUBSOIL DRAIN PIPE

Portions of table not shown remain unchanged.

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F405; CSA B182.1; CSA B182.6; CSA B182.8

Reason: ASTM F405 was withdrawn by ASTM. The content of F405 for the most part is contained in ASTM F667, which is already referenced in Table 1102.5, and is proposed for addition to IRC Tables P3009.11 and P3302.1 (see proposal 7039).

Bibliography: ASTM F405 - Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings (Withdrawn 2015)
ASTM F667/F667M - Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings

Cost Impact: The products specified in ASTM F405 were moved to ASTM F667. The impact to construction is neutral.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

P140-21 Part II AS

P143-21 Part II

Original Proposal

IRC: TABLE P3302.1, TABLE P3009.11, ASTM Chapter 44 (New)

Proponents: Shawn Coombs, Advanced Drainage Systems, Inc., Advanced Drainage Systems, Inc. (shawn.coombs@ads-pipe.com)

2021 International Residential Code

Revise as follows:

TABLE P3302.1 SUBSOIL DRAIN PIPE

MATERIAL	STANDARD
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Polyethylene (PE) plastic pipe	ASTM F405; <u>ASTM F667/F667M</u>; CSA B182.1; CSA B182.6; CSA B182.8
Polyvinyl chloride (PVC) plastic pipe (type sewer pipe, SDR 35, PS25, PS50 or PS100)	ASTM D2729; ASTM D3034; ASTM F891; CSA B182.2; CSA B182.4
Stainless steel drainage systems, Type 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C4; ASTM C700

TABLE P3009.11 DISTRIBUTION PIPE

Portions of table not shown remain unchanged.

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F405; <u>ASTM F667/F667M</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>F667/F667M-16</u> <u>Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings</u>

Reason: ASTM F667/F667M covers pipe and fittings. The proposal to add this standard to Table 1102.7 - Pipe Fittings is just to highlight that the pipe standard listed on Table 1102.4 and 1102.5 covers fittings as well as pipe.

Bibliography: ASTM F667/F667M - Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings

Cost Impact: The addition of ASTM F667/F667M to Table 1102.7 doesn't impact construction cost. It simply highlights that the standard covers pipe and fittings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

P143-21 Part II	AS

P147-21 Part II

Original Proposal

IRC: APPENDIX AX (New), SECTION AX101 (New), AX101.1 (New), AX101.2 (New), SECTION AX102 (New), AX102.1 (New), SECTION AX103 (New), AX103.1 (New), AX103.2 (New), AX103.3 (New), AX103.4 (New), AX103.5 (New), AX103.6 (New), AX103.7 (New), SECTION AX104 (New), AX104.1 (New), AX105 (New), AX106.1 (New), TABLE AX106.1 (New)

Proponents: Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org); CJ Lagan, LIXIL, LIXIL (cj.lagan@lixil.com); albert rubin, NCSU, self (rubin@ncsu.edu)

2021 International Residential Code

Add new text as follows:

APPENDIX AX NON-SEWERED SANITATION SYSTEMS

SECTION AX101 GENERAL

AX101.1 Applicability. The provisions of this chapter shall apply to the installation of non-sewered sanitation systems.

AX101.2 System requirements. Non-sewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

SECTION AX102 DEFINITIONS

AX102.1 General. For purposes of this chapter, the following definitions shall apply.

Conditioned Space. An area, room, or space normally occupied and being heated or cooled for human habitation by any equipment.

Non-Sewered Sanitation System. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

SECTION AX103 INSTALLATION

AX103.1 General. The installation of non-sewered sanitation systems shall be in accordance with the manufacturer's installation instructions and with Section AX103.2 through AX103.7.

AX103.2 Operating conditions. A non-sewered sanitation system in either a conditioned or unconditioned space shall be installed where the ambient temperature, ambient humidity, and altitude (atmospheric pressure) are in accordance with the manufacturer's installation instructions or product listing.

AX103.3 Clearances for servicing and maintenance. A non-sewered sanitation system shall be located to permit access and sufficient clearance for service and maintenance. Unless otherwise specified by the manufacturer's installation instructions, not less than 30 inches in depth, width, and height of working space shall be provided at any access panel.

AX103.4 Backflow prevention. A domestic water supply connection to a non-sewered sanitation system shall be protected in accordance with Section P2902 of this code.

AX103.5 Effluent storage. Any container or vessel for the storage of effluent discharged from a non-sewered sanitation system and not integral to such system shall be installed in accordance with Section P2910.9 of this code.

AX103.6 Systems employing combustion. A non-sewered sanitation system employing combustion shall comply with the mechanical code.
Exception: A non-sewered sanitation system listed for unvented use.

AX103.7 Connection to plumbing system not required. Unless the Authority Having Jurisdiction determines otherwise, a non-sewered sanitation system is not required to be connected to the sanitary drainage system of the building or premises.

SECTION AX104
MANUAL REQUIRED

AX104.1 Operation and maintenance manual. Non-sewered sanitation systems shall have an operation and maintenance manual provided by the manufacturer.

AX105 System output. The use or disposal of all substances exiting the non-sewered sanitation system shall be determined by the Authority Having Jurisdiction.

AX106.1 General. See Table AX106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference the standard.

TABLE AX106.1 REFERENCE STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/CAN/IAPMO/ISO 30500-2019	Non-sewered sanitation systems - Prefabricated integrated treatment units - General Safety and performance requirements for design and testing	AX101.2

Reason: This proposal covers the essential considerations that a building official must assess when a non-sewered sanitation system (NSSS) as defined herein is installed in a building. Designed for operation without a sewer connection and, in many cases, without a dedicated water supply, NSSSs are anticipated to meet critical public health needs in areas with limited water and wastewater infrastructure, water supply constraints, and/or unfavorable soils for traditional on-site disposal methods. In the U.S., over 20% of the population relies on an on-site wastewater system. And even today, a portion of our population does not have access to fully functioning sanitation, largely due to lack of affordable infrastructure or to challenging site conditions.
In 2011, the Bill & Melinda Gates Foundation launched the "Reinvent the Toilet Challenge" to bring new technology to bear to achieve sustainable sanitation solutions. The target is a factory-built device that provides complete and effective treatment of human sanitary waste, unconnected to any sewer or drainage network and with minimal inputs of energy and water. Eight teams received Foundation support to develop prototypes for lab testing, field trials, and commercialization. Among these initial devices, three broad pathways for treatment technology have emerged -- electro-chemical, biological, and combustion -- and in some cases, combinations of these in the same device. Manufacturers have been involved in these efforts, and LIXIL (owner of the American Standard brand) and other companies are working to develop compliant systems for both domestic and international installations. It is the general preference of manufacturers to design and market systems that are compliant with published codes and standards, rather than one-off compliance reviews by individual jurisdictions.

To facilitate commercialization of hi-tech toilets and their acceptance by state and national regulatory bodies, an ISO standard was adopted in 2018 to establish the key performance attributes of NSSSs. Standard 30500, *Non-sewered sanitation systems - Prefabricated integrated treatment units - General safety and performance requirements for design and testing*, sets performance requirements for solid and liquid outputs, odor, noise, air emissions, materials, safety, marking, and ergonomics, together with relevant test procedures for measuring the attainment of these requirements. This ISO standard was adopted in identical form as a U.S. and Canadian national standard in 2019, designated as ANSI/CAN/IAPMO/ISO 30500:2019.

This proposal addresses the considerations that must be taken into account by building officials regarding the placement and installation of NSSSs in buildings. The proposal would permit (but not require) the installation of a NSSS listed to the ISO standard, and provide an exception to the general requirement in the code that sanitation devices be connected to the building drainage system, unless a connection is required by the AHJ. Certain key protections, such as backflow prevention, proper ventilation of combustion-based units, and proper siting of storage tanks (if any) external to the unit are each specified in the proposal. Considerations of the use and disposal of outputs of the system are specifically referred to an AHJ, which most likely will be a health department.

Criteria for the functioning of the unit for its intended purpose are established by the ISO standard and do not need to be repeated in plumbing code language. It should be noted that the ISO standard was developed by an international group of scientists, engineers, and regulators to assure the highest levels of treatment would apply to all outputs (air, water, and solids) from the device. The performance-based standards allow a variety of technologies to be applied, so long as key metrics are achieved. The microbiological reduction requirements for solid and liquid waste are based on the quantitative microbial risk assessment (QMRA) method recognized by the World Health Organization for this purpose. The requirements of the standard mimic the highest quality standards imposed by regulatory agencies on waste-derived materials destined for reuse. The standard's test procedures are rigorous (both lab and field tests are required), and the proposal allows only NSSSs listed to the standard to be approved for installation under this appendix.

With "Reinvented Toilets" meeting the 30500 standard now on the cusp of commercialization, the arrival of such toilets at job sites across the country can reasonably be expected by the time this code update is published and adopted by states and localities, e.g., 2025. Clear code language will accelerate the availability of safe sanitation for people who lack it today. While much is still unknown about the cost, maintenance, and reliability of NSSSs, or even the business model for their installation and servicing, forward-looking communities and jurisdictions with acute sanitation needs will want to be prepared for the safe installation and use of this promising new technology as it enters the market. This proposal lays out the necessary groundwork for code officials to inspect and approve their installation, set out in an appendix available for voluntary adoption by state and local code bodies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal creates an appendix for voluntary adoption, and thus poses no additional costs on construction built to the base code. In jurisdictions where it is adopted, the proposal authorizes, but does not require, installation of a non-sewered sanitation device, as defined. Builders remain free to install less expensive sanitary ware if they so choose. First costs of an NSSD are expected to be higher than a conventional flush toilet, but may reduce sewer connection charges. NSSDs may also allow construction on sites that might otherwise be unbuildable due to lack of sewer infrastructure or site conditions unsuitable for conventional on-site systems.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
AX103.6 Systems employing combustion.
A non-sewered sanitation system employing combustion shall comply with the mechanical code.

~~**Exception:** A non-sewered sanitation system listed for unvented use~~.

AX103.7 Connection to plumbing system not required. ~~Unless the Authority Having Jurisdiction determines otherwise, a~~ A non-sewered sanitation system is not required to be connected to the sanitary drainage system of the building or premises.

Committee Reason: For the modification: Some extraneous language needed removed and the exception was found to be in conflict with the mechanical and fuel gas sections of the code.
For the proposal as modified: This is a good addition to the appendix of the code as there are some remote areas where septic systems are

not possible. The language provides guidance to the code official to be able to work with the local health authority for using this method. (11-0)

Final Hearing Results	
P147-21 Part II	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

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	R905.4	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.
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	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.

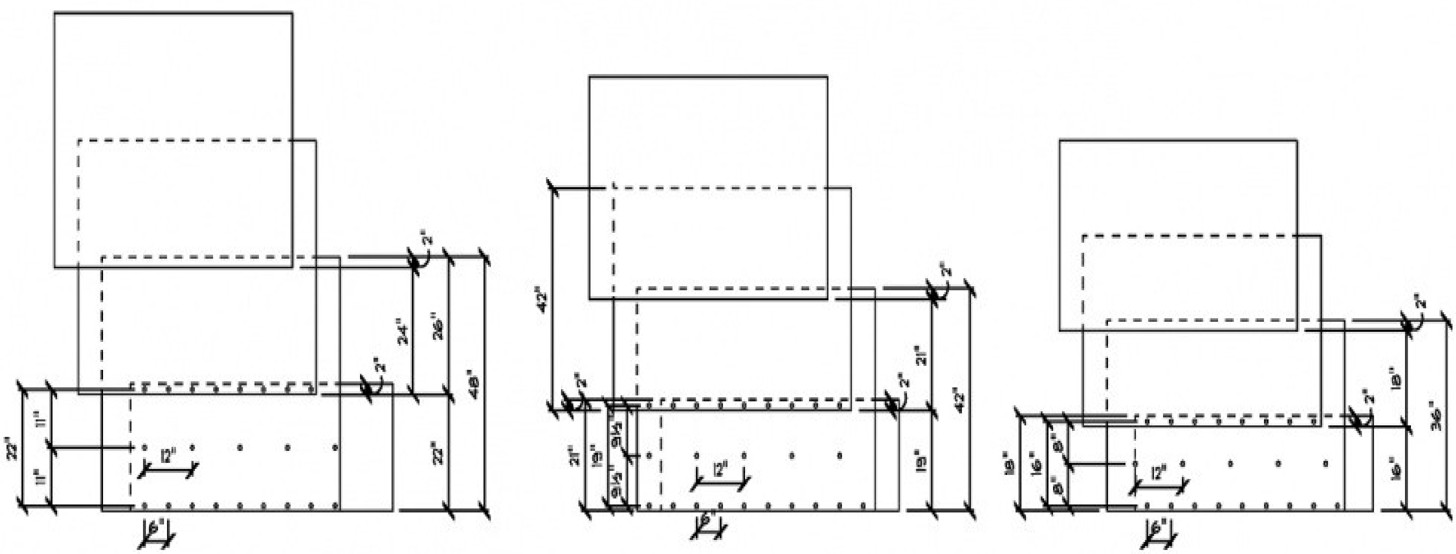
Add new standard(s) as follows:

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:

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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

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

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

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

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:
<u>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.</u>

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 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, ~~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~~ or a drainage space or means of drainage complying with R703.7.3.2. 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.

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